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1991 Annual Catalog for the Technical Hobbyist & Science Educator

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When we first started the business back in 1970, we were not certain as to how Canadians would react to the variety of unique, technical and scientific specialities offered in this catalogue.

I must admit that by now I am very pleased and enthused to see even a "second generation" of parents visiting our store with their children, as their parents did with them. We receive letters from customers telling us how some of our items contributed to their professional endeavours and careers. This is a very satisfying feeling, to serve and help the community to which we belong.

In order to serve you, our clients even better since Free Trade is in effect we provide you with the original American priced catalogue along with instructions for converting from the American price to the Canadian price.

As a Canadian, my strong wish is to preserve our country and our environment, with pride in our accomplishments and contributions for the generations to come through science, technology and reasoning in our thinking.

Best Regards,

Evan Efston, President

PRICING INFORMATION

Prices shown in this catalogue are American (in U.S. dollars). To convert to Canadian cost (which includes U.S. to Canadian dollar exchange rate, import duty, transportation & insurance from the U.S.) multiply by the factor of 1.42, adding G.S.T. when applicable. (Please note, quantity discounts shown do not apply to this conversion and some items may not be available in Canada.) For Ontario residents only please add Provincial Sales Tax if applicable.

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For detailed ordering information and shipping cost chart, see next page.

NOTICE

As a rule all electrical items in this catalogue are CSA approved. There are however some special instruments which may not have CSA approval or the Ontario Hydro inspection performed on them. If your application requires such and approval please specify with your order. Please note that an additional inspection fee may be charged for this service by the inspecting facility or you may submit the item to your local (Provincial) Hydro for approval.

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It's smart when you can shop from the convenience of your home or office. Browse through the pages and discover the particular items which will give the best value for your money. We guarantee the quality of the products and service we provide. **Mail your order today, phone-in or fax-in your choice of any item from this catalogue.**

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A modern way to order, if you are a charge card holder, VISA (Chargex) or MasterCard, is to phone in your order between 9 AM and 5 PM EST. Call **(416) 787-4581** Monday to Friday, or 10 AM to 5 PM Saturday. **Collect** calls accepted only for placing orders. Fax orders accepted anytime, our fax number is **(416) 787-5140.** Please provide us with your phone and fax number when you are ordering.

SPECIAL PRICING AND DELIVERY INFORMATION:

We have discovered to our disappointment, that despite enormous efforts in the past to have accurate and up to date Canadian prices listed in our catalogues, most became obsolete within months. The main reasons are the Global currency instability, the Import Duty & Taxes Regulation changes and manufacturers prices fluctuations, in the process some prices became lower or higher. It has been decided therefore that it will be more practical to use the American Catalogue Prices (in USA Dollars) and convert to approximate Canadian prices by multiplying with the factor 1.42. This is to include the USA to Canadian Dollar exchange rate, the average import duty, transportation and other expenses. To this 7% G.S.T. should be added, and the shipping cost to you from the chart on the order form, except if other arrangements have been made. Although it sounds complicated, in effect this is very easy, with a hand calculator. It is advisable that when you place your order to ask for price & delivery confirmation. Please note that some items listed in this catalogue are not available in Canada. and that the quantity discounts shown are not applicable when the conversion factor is being used. Call or Fax us for special quantity discounts. In stock items will be shipped within 48 hours, for others not in stock, delivery could be 2-3 weeks or sooner. You can be assured that we spare no effort to provide you with the lowest possible prices and the best service to satisfy your requirements. Please purchase with confidence!

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$50.00 minimum to high rated firms and educational institutions only. Purchase orders must be signed by authorized person, if confirming please indicate so. Orders under $50 but not less than $30 will have a $5.00 handling charge. Payment terms 30 days net. On new accounts until credit is established, shipments will be made prepaid or on C.O.D. basis. Orders requesting special shipping instructions must authorize invoicing of extra cost. Prices quoted in the catalogue supercede all previous catalogues, advertisements and brochures, and are subject to change according to the American-Canadian dollar exchange rate and other variables.

Report items received broken or short shipped immediately and do not return shipments without authorization from us. If you do, this may void the insurance coverage.

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A 10% DISCOUNT applies if the items qualify for exemption from import duty and G.S.T. This can be obtained when an official purchase order is issued or the institution's letterhead is used. An end use certificate, signed by an authorized individual is required to qualify. According to regulations, only items made exclusively for education or research will qualify. If a claim for exemption is not submitted, full catalogue prices will apply to all items ordered. Please identify items ordered by catalogue stock number and a brief description, and clearly indicate shipping and invoicing instructions.

QUESTIONS ABOUT YOUR ORDER:

When writing or calling us, provide any number which appears on your invoice number or cancelled cheque and the approximate date the order was placed and the same name or company and address including postal code the order was originally placed, giving also stock numbers and we will do our best to give you a satisfactory answer. **Delivery information, Complaints, Adjustments** – Call 416-787-4585 from 9 AM to 5:00 PM Monday to Friday. According to our guarantee policy, **items may be returned within 30 days from the date of shipping if not satisfactory, in the original container and condition.** After that period, no returns will be accepted without prior approval, and a 20% or more restocking charge will apply, depending on the condition. **Books, printed matter, slides, tapes, recordings, sale items, surplus products and custom cut or made goods are not returnable.**

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If you are not completely satisfied, for whatever reason, with anything you buy from EFSTONSCIENCE Inc., return the merchandise in its original container and condition, prepaid with your sales receipt and all papers in the package within 30 days from the shipping date shown on our invoice and we will gladly refund the full purchase price.

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Send us his/her name, job title, company and/or department, company address and we'll send him/her our next catalogue **FREE.**

FREE MAGNIFIER WITH ANY ORDER OVER $20. SEE PAGE 5.

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QTY.	STOCK NUMBER	BRIEF DESCRIPTION	UNIT PRICE	TOTAL	

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Shipments from $100.01 to $300 ..... add	10.75
Shipments from $300.01 to $500 ..... add	15.75
Shipments from $500.01 to $1000 ..... add	21.75
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Except for items over 20 kg or over 1.8 meters combined perimeter and length. These items will be shipped to you collect.

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Add G.S.T. at 7%		
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City Prov. P.Code

Phone Fax

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AND last, but not least, we THANK YOU for the order you are sending us. We will do our best to satisfy you with your purchase. Your name will be added to our mailing list to receive our new catalogue. Please inform us of any change of your address providing the catalogue mailing label or the code number on it if possible.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE.

EDUCATIONAL GRADE DIODE LASER

• Focusable Beam
• 4mW Maximum Output

Utilizing the same basic technology as found in laser pointers and CD players, we designed this simple diode laser for educational and basic industrial applications. It is ideal for primary optical bench demonstrations and experiments. Also useful for optical alignment and physical alignment in manufacturing when the range is under 5 feet. Comes with 110V AC plug-in transformer, On/Off switch. Fits our 1" ring mount for easy mounting to any post or positioning equipment.

SPECIFICATIONS:

Maximum Output: 4mW
Class Laser: IIIb
Beam Diameter: 6mm x 2mm
Polarization: >10:1
Dimensions: 1" Diameter x 2" Long
Laser Type: Diode
Wave Length: 675nm (typically)
Beam Divergence: <0.5mr
Power Requirements: 110V AC
Min. Focusing Range: Down to 20mm

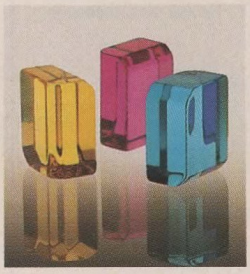
Diode Laser	**E39,569**	**$149.00**
Accessories: (To mount as shown in photo)		
• 1" Ring Mount	**E39,570**	**$17.00**
• 4" Long Post	**E36,499**	**$12.00**
• Post Holder and Circular Base	**E3663**	**$42.00**

HELIUM FUN PARTY KIT

• Perk up a party or rainy day.

Kit includes two cans of helium, plus 3" balloons. To conserve helium, partially inflate each balloon with air, then place over nozzle and finish inflating the balloon until it floats.

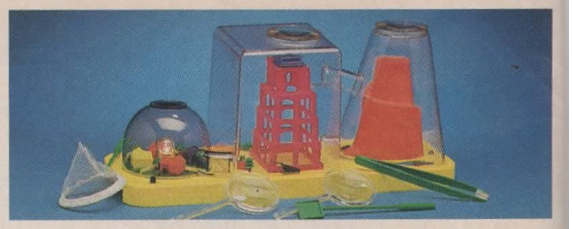
Two Cans of Helium E71,289 $15.95



OPTICAL FILTER PRISMS

Learn the principle of color, light and optics with one magenta, one cyan and one yellow, 2" x 1", precisely calibrated and formulated dyed acrylic filter prisms. When held in various combinations and angles produce an extraordinary range of pure color hues.

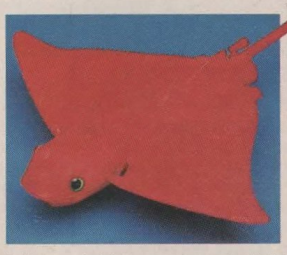
E39,637 $25.00



A REAL TOWNHOUSE FOR "CRITTERS"

Collect and observe the world of bugs, ants spiders...A safe polycarbonate three domed enviornment is ideal for bug viewing and study. Includes two handheld magnifiers, collecting tools, food basket, built-in magnifiers in each dome, 2 critter lakes, recessed handles and a complete activity guide.

Critter Condo™ E39,634 $12.95



TIMANTA™, THE SWIMMING MANTA RAY

Propelled by a twist action rubber band motor, just crank Timanta's tail and gently lay her on the water's surface. She will swim for up to 45 seconds underwater, then return to the surface. Adjust her "control knob" for loops; left or right turns; or straight swimming. Made of heavy duty soft ABS plastic. Ideal for pools and bathtubs. Red with yellow polka dots. For "swimmers" ages 5 and up.

Timanta™, The Manta Ray E39,624 $22.00

VISUAL ILLUSION CARDS

Prepared by psychology professors Dr. J. Block and Dr. H. Yuker of Hofstra University. Contains 52 different visual illusions and instructions. Examples: Illusions in color, color reversal, ambiguous figures, size and figure distortion... Card Size 3-1/2" L x 2-1/2"W.

Set A: Can You Believe Your Eyes E39,635 $7.00
Set B: More Illusions and Visual Oddities E39,636 $7.00

A. 55MM PROJECTION LENS

55mm f/2.8, 3 element color corrected projection lens. Dimensions are: 1-13/32" x 1-5/16" Diameter. 19mm clear aperture anti-reflective coated with 1-1/4-20 TPI for mounting.

Projection Lens E39,571 $15.00

B. PROJECTION LENS

• Covers 10" x 10" Copy Size

Ideal for opaque projection. High grade, coated, three element optical glass lenses mounted in aluminum cell 4-1/4" OC x 4-1/8" Long. Clear aperture: 3-5.8".

Focal Length: 11" **Weight:** 3-1/2 Lbs.
Projection Lens E39,027 $119.95

C. PROJECTION LENS

• F/5 20" Focal Length • Coated Optics

Mounted in aluminum barrel 4" diameter x 4" Long. Made by Charles Beseller company. Ideal for opaque projector, camera obscura or other types of drawing projectors.

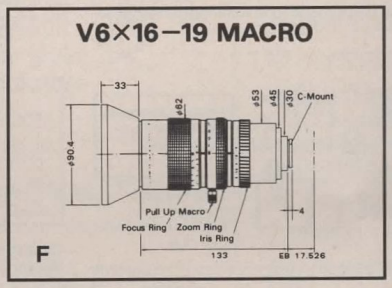
Projection Lens E39,028 $98.50

D. TV PROJECTION LENS

• Made by U.S. Precision Lens

Designed specifically for compact rear projection video, featuring high contrast and 80-character image performance. A non color-corrected lens designed for use with a 350mm curved faceplate CRT. Designed to be optically coupled to the CRT's in order to achieve higher contrast ratios. Aspheric plastic and spherical glass elements, which allow for improved focus stability in high temperature environments. f / number - f/1.0. Surplus.

Focal Length: 89 to 90mm
CRT Raster Diagonal: 134.0mm (5.25")
Projection Lens E39,623 $19.95



E. PROJECTION LENS

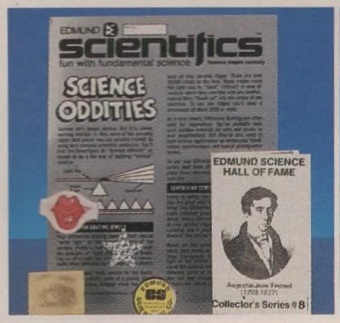
5" f/3.6, 18"F.L. Coated optics mounted in a 5.70" x 6-3/16" Long aluminum barrel. Besco 18" E.F. Series III.

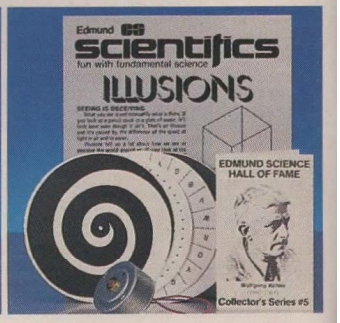
Projection Lens E39,622 $99.95

F. CANON ZOOM CCTV LENS

• For 1", 2/3" and 1/2" Camera

V6 x 16 to 19 Macro
Focal Length: 16mm to 100mm
Zoom Ratio: 6 **Weight:** 1.3 lbs.
Max. Relative Aperture: F1.9 Coated Optics
Focus: From 2" to Infinity
CCTV Lens E38,701 $199.00





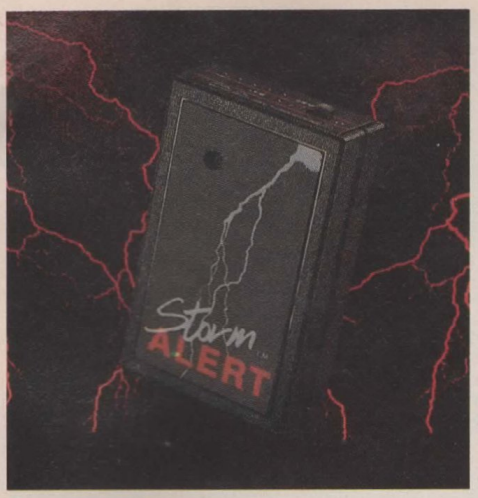
ES "SCIENTIFICS" ARE 8 MINI "HANDS-ON" SCIENCE EXPERIMENTS

• Introduce Scientific Principles • Stimulate Young Minds

"Scientifics" explore eight different science areas. Kits include background material on the topic to be explored, the materials needed to carry out those explorations, suggested experiments and "Hall of Fame" background on famous scientists.

Magnets: Watch magnets float in space or build a compass. **E1001 $3.99**
Prism: Precision glass prism breaks sunlight into a rainbow of color. **E1002 $3.99**
Mirrors: Build your own kaleidoscope. **E1003 $3.29**
Weather: A miniature weather forecast station in a kit. **E1004 $5.29**
Illusions: Optical illusions trick the mind and eye. **E1005 $3.79**
Color: Assorted filters show how primary colors build a rainbow. **E1006 $3.99**
Bi-Metal Discs: Our thermal jumping discs leap over 2 ft. in the air. **E1007 $3.79**
Science Oddities: Rainbow grating, winking eye, jumping disc. **E1008 $3.79**

SAVE $6.97 - Asst. of 8 Kits (One of each) E31,539 $24.95



STORM ALERT™

Killer lightning does not give much warning. Lightning can strike twenty miles in front of the clouds. The audible distance of thunder is only 5 - 8 miles. Though you can't be sure a storm is coming right at you or just moving through your detectable field, at speeds up to 75 miles per hour, your advance warning can be critical. Most lightning deaths occur because of inadequate warning rather than poor judgment.

Storm Alert™ is a small, battery-powered, portable electronic device that can warn you when you may be in danger from lightning. Storm Alert™ uses a discriminating front-end radio receiver coupled with a digital signal analyzer to receive and qualify the electromagnetic and rf signals generated by distant lightning ground strikes. When Storm Alert™ sees enough ground strikes in a short enough period, there is a statistically significant danger. It warns you by lighting a series of monitor LED's and sounding a loud piezo buzzer. Storm Alert™ normally gives at least fifteen minutes warning. Powered by a standard 9V battery (not included), it is easy to use and can be safely secured to your clothes or accessories. Unit measures 3-3/4"H x 2-1/2"W x 1"T, with belt clip.

Storm Alert **E39,280** **$125.00**

WIDE ANGLE PANORAMIC FRESNEL LENSES

- **Adhere To Any Glass Window**
- **Expand Your Field of View**

Flexible soft PVC fresnel lenses are easy to apply to any window surface to provide a panoramic view. A little water is all that is required and the lens can be easily repositioned as required. Ideal for the rear window of mini-vans, campers and trucks to greatly enhance your downward and sideways vision. Made from optical quality polyvinyl chloride, cleans easily with mild detergent.

Diagonal Size:	9 Inch	12 Inch	16 Inch
Dimensions:	6" x 8"	8" x 10"	11" x 14"
Viewing: Sideways	25°	24°	25°
Upward	11°	12°	15°
Downward	27°	27°	25°
Stock Number	**E39,158**	**E39,159**	**E39,160**
Price	**$9.00**	**$10.50**	**$15.75**

MINOLTA CONTINUOUS AUTOFOCUS BINOCULARS

- **CCD Sensor Technology**
- **Precision Multi-Coated Optics**
- **Close Focusing Distance**

Utilizing the same intelligent autofocus technology found in Minolta's Maxxum 35mm SLR cameras, these binoculars are ideal for fast action sports and bird watching. Simply press the AF power button and the subject snaps into razor-sharp focus. Let the button go, and the focus locks. Hold the AF button down, and the binoculars track fast moving subjects effortlessly. There's even a manual focusing capability for rare occasions when AF override is desirable. Minolta's autofocus system is so fast and precise, it eliminates the fatigue and eyestrain that can occur when viewing a slightly mis-focused image. These binoculars are exceptionally comfortable even when used for extended periods. Minolta AF binoculars focus as close as 6.6 feet. See even the smallest details, or watch the slightest movements of birds or butterflies. Most conventional binoculars focus no closer than 16 feet, and the "permanent-focus" type are fixed at a minimum distance of 40 feet or more. Minolta autofocus binoculars are designed to fit the user's hand comfortably. All buttons are placed where the fingers naturally fall, for quick and easy access; plus, the sleek and futuristic shape sets them a world apart from ordinary binoculars. Minolta autofocus binoculars feature the highest quality multi-coated, anti-reflective optics and prisms. This assures optimum edge to edge sharpness and contrast. Powered by one 6V 2CR5 Lithium Battery (included). Diopter and IPD adjustable.

5-3/8" x 2-1/8" x 5"

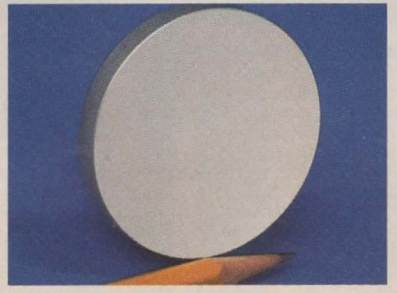
SPECIFICATIONS:	**8 x 22**	**10 x 25**
Magnification:	8X	10X
Objective Diameter:	22mm	25mm
Angle of View:	6.5°	5.2°
Close Focus:	6.6 ft.	9.2 ft.
Field at 1,000 Yds.:	342 ft.	273 ft.
Exit Pupil Diameter:	2.8mm	2.5mm
Brightness Index:	7.6	6.3
Weight:	18-11/16 oz.	19-1/16 oz.

8 x 22 Binoculars
E39,126 **$249.95**
10 x 25 Binoculars
E39,125 **$279.95**

EYE INSPECTION MIRROR

• Inspect Your Own Eye • Check Contact Lenses

Our precision radius mirror with front surface coating allows you to inspect your own eye by simply holding the mirror approximately 2 inches in front of your eye. Ideal for contact lens wearers or to inspect for irritant alien particles. Mirror is 2 inches in diameter with front surface aluminized coating.



Inspection Mirror **E39,152** **$9.95**

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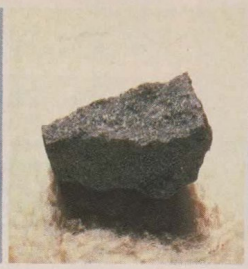
FREE
MAGNIFIER WITH ANY ORDER OVER $20.
JUST ASK FOR IT.

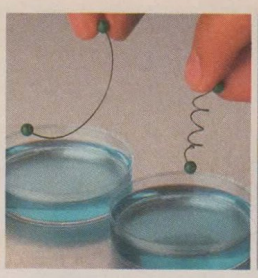
HAND BOILER
This fascinating physics novelty demonstrates that vapor pressure increases when temperature increases. The warmer your hand the better it works. Contains color dye and methylene chloride. For 12 years and older. **E37,299 $3.95**

3-D SPINNING DAZER
3-3/4" disc coated with diffraction grating material. Small dimple on the bottom allows it to "spin" for several minutes. Diffraction design changes as it spins.
E37,272 $5.75

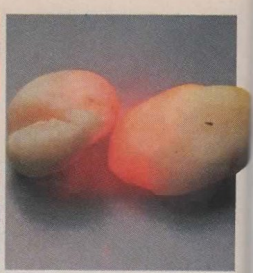
SPECTROSCOPE
Observe how white light can be separated into the colors of the spectrum. Diffraction grating breaks light down to color components.
Pkg. of 1 E35,802 $2.50
Pkg. of 15 E38,561 $34.95



BOGUS BOULDERS
These soft rocks look just like real granite, but are actually realistically-painted foam pieces. Approx. 4" x 2-1/2" x 2". 1/6 oz. each. Package includes a pile of 6 rocks.
E37,476 $17.95



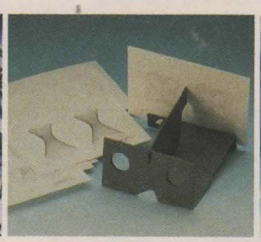
WIRE WITH A MEMORY
A 3" length of Nitinol wire with small plastic knobs at either end. Put it in cold water, bend it into crazy shapes, put in hot water—it pops back straight again. **Pkg. of 2 wires.**
E37,308 $5.95 Pkg.



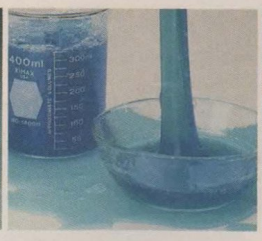
FLASH ROCKS
Nature's Piezo effect. 2 rocks per bag. Just scratch together firmly in a dark place and weird light flashes will occur. This is the result of an electric discharge. Pack of 3 bags **(total of 6 rocks).** **E37,474 $7.50**

THE VANISHING LEPRECHAUN GAME
A fascinating & clever illusion. We found it at a Math teachers seminar. A 3" x 7" card that you cut into three pieces. Reverse the top two pieces—a leprechaun vanishes. Reassemble the pieces and he reappears. One of our most popular retail store items for many years. Share it with friends. Pkg. of 4 illusions. **E37,473 $6.25**

BAGS OF BUGS
Startlingly realistic, lifesize, excellent for pre-school, laboratory bug collections, ant farms, picnics and general great fun. All plastic.
Ants E37,477 $2.95
Spiders E37,478 $2.95
Flies E37,479 $2.95
1 Pkg. of Each Above
E37,911 $5.95

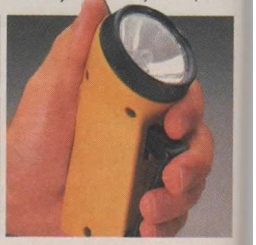


STEREOPTICS
3-D viewer, instructions and 18" "stereo pairs". Two drawings are precisely drawn by a computer to show an object as it would look from two points as far apart as human eyes.
3-Dimensional Viewer
E37,266 $6.95



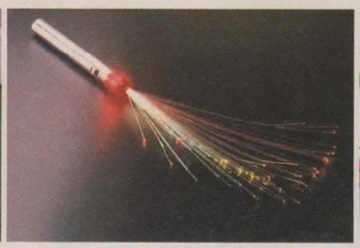
MOON BLOB
Moon Blob acts alive and looks like a living protoplasm as it defies gravity by crawling up and out of its container. It's dehydrated plastic - just add water to activate. Completely harmless. Two packages.
Moon Blob (Pkg. of 2)
E38,440 $7.25

MOIRE ARRAY KIT
Twenty 2-1/4" square moire pattern cards and transparencies. To create a moire effect, simply place a plastic pattern over a paper one and slide them slightly. Black, Cyan, Magenta and Yellow transparencies for exploring the 4-color printing process.
Moire Array E37,261 $4.75

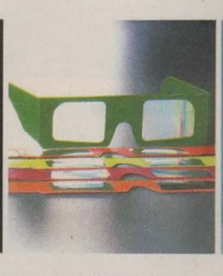


HAND GENERATOR
Shines a bright light with a squeeze of the handle. Works without costly batteries. Hand powered by a miniature generator. Demonstrates the transformation of mechanical energy into electrical energy. 5" long. Yellow and black plastic. Has handy wrist strap.
Generator E34,031 $8.75

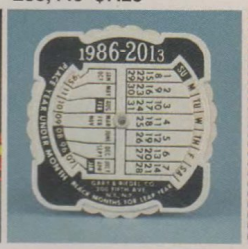
SPACE FIDGET
Pressure and heat sensitive material creates limitless colors and patterns. Rub or press gently for a few seconds with your thumb or finger on either the front or back, lift and the material changes color from the heat generated with your touch. 3" diameter, plastic disk.
Set of 2 Fidgets E37,189 $7.75



ASTROLITE FLASLIGHT DISPLAYS SWIRLING SHIMMER OF FIBER OPTIC LIGHT
A kaleidoscope of colors that change as you shake and wave Astrolite. Llight source at the base transmits through tiny fibers which emerges as pinpoints of color at the tips. 14" metal flashlight base with on/off switch. Uses 2 "AA" batteries (not incl). **E31,771 $7.95**

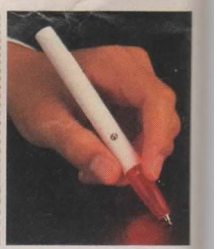


6 RAINBOW GLASSES
Two diffraction gratings mounted in cardboard frames divide light into different colors. One size. Five different neon-colored frames.
E42,319 $6.95



28 YEAR CALENDAR
Compute-A-Date for the next 28 years. Find out on what day your birthday falls, days etc. Just turn the dial so that the year you want is under the desired month. 1-1/2" x 1-1/2", aluminum.
Pkg. of 2 Calendars
E37,191 $5.95

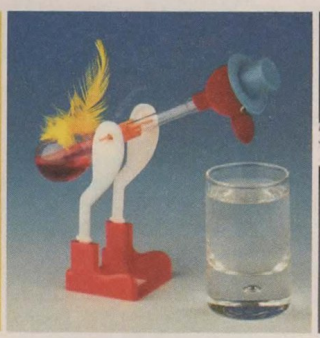
PACKAGE OF FOUR MAGIC TOPS
Magic Topsy Turvy Tops with secret control—defies gravity. Only 1-1/2" high. When quickly rotated, will turn upside down. Bag of four multi-colored tops.
4 Tops E37,172 $10.95



WRITE IN THE DARK
Nightwriter pen has built-in light, activated when cap is placed on end. Blue ink. With refill. Uses two "AA" batteries (included). Pocket clip.
Pen E33,543 $10.95

A. YO-YO TOP®
First, it's a yo-yo. Then unscrew one fender and it becomes a top that spins up to 12,000 RPM for a full 5 minutes. High impact 2-1/4" x 2-1/2" acrylic. **E39,141 $9.95**

B. Hand Propelled Flying Machine Propeller
Just rub the stick briskly between both hands; with correct momentum, the propeller will release up into the air. Pkg. of 3. **E39,142 $4.95**

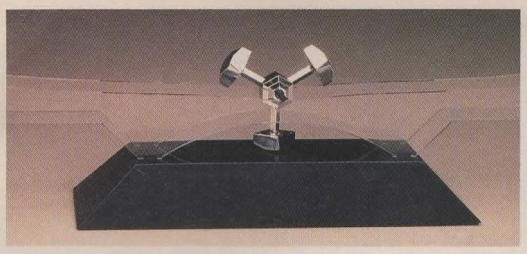


AMAZING DRINKING BIRD
• Ideal Science Project/Aid
Happy Bird never stops drinking. Simply duck the bird's head into a filled glass of water to begin bobbing motion. Bird then takes over, continuously dipping into the water for a drink. Glass bird contains Freon-11, which can stain. May also be used as a relative humidity indicator. Requires adult guidance.
Drinking Bird E60,778 $3.95
2 for $3.50 Ea.4 or More, $3.00 Ea.

ASTRONAUT ICE CREAM
A delicious, ready-to-eat assortment of freeze dried strawberry, chocolate and vanilla ice cream that melts in your mouth. It is real ice cream frozen to -40°F, vacuum dried and sealed in a pouch. U.S. astronauts enjoy similar ice cream on space missions. Package of 2 ice cream pouches.
Astronaut Ice Cream
(Pkg. of 2) E38,214 $5.25

MAKE YOUR OWN WILD TORNADO
• Create The Vortex Of A Tornado Within A Bottle
• Employs Hydraulic Principles
Our Tornado Tube assembly allows you to demonstrate the wild vortex phenomenon of a natural tornado. All you need are two 1 liter or 16 oz. plastic soda bottles and ordinary tap water. Swirl water from the top bottle to the bottom one using tornado vortex action. Instructions and explanation of scientific principles included. Package of 2 tubes and instructions.
Pkg. of 2 Tornado Tubes E37,592 $3.95

SEA MONKEYS
Kit includes all the material necessary to hatch your own school of sea monkeys: clear acrylic ocean zoo aquarium , aquarium cover, illuminated aerating ring, water purifier, Sea Monkey eggs, a year's food and vitamin supply, feeding spoon, 16 page handbook and growth guarantee.
E35,188 $8.95



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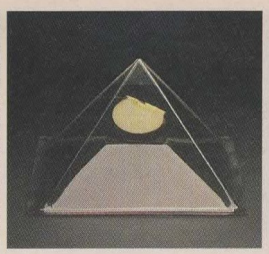
E31,132 $19.95



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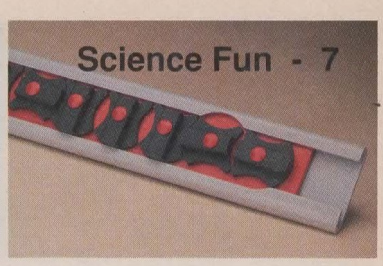
Pyramid E71,817 $39.95

C) TANGLE™ SCULPTURE

Tangle™ is a movable, 3-dimensional kinetic structural form based on the concept of infinity. Made out of rotating connected links, it can easily be twisted, turned, bent and shaped. Made of durable red plastic.

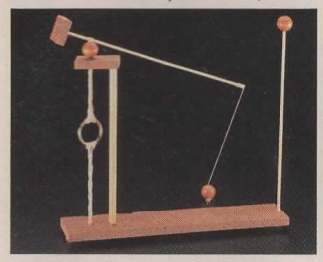
Tangle™ E37,481 $15.95



D) SPIN-OUT™ PUZZLE

The idea is simple: just turn the disks at the indicated spot, one by one. When the disks are all turned sideways, the slide will unlock from the base and can be removed. Beware: it's tougher than it looks. Spin-Out™ will have you going in circles for hours. Invented by William Keister, a pioneer in telecommunications switching system theory and design.

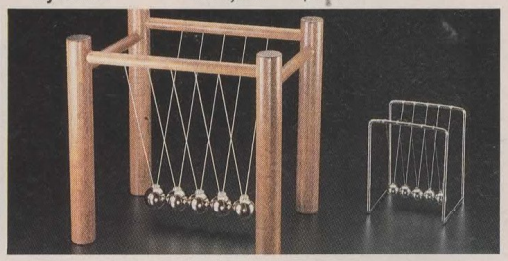
SPIN-OUT™ Puzzle E37,902 $10.95



GET INTO THE SWING OF THINGS

This fascinating toy actually demonstrates the physics of energy and motion. Carefully crafted in rich, oil finished wood. Metal parts. Easy to assemble friction-fit parts. As much fun to put together as it is to watch.

Perpetuo E42,634 $7.95



SWINGING WONDER BALANCE BALLS

A conversation piece you can't resist. Swing one of the five nickel-plated balls and one on the other side swings back. Demonstrates motion laws.

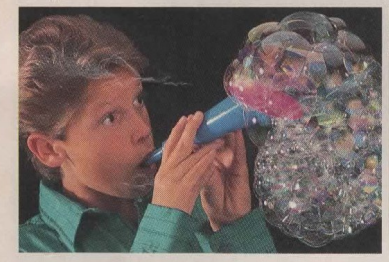
Large Balance Ball. 9" L x 9" H x 7" W. Wood frame. **E33,739 $22.95**

Medium Balance Ball. 3-1/2" L x 4-1/2" H x 3-1/4" W. Chrome frame. **E37,901 $4.95**

"SPACE": THE GAME THAT DEFIES GRAVITY

Winner of the "Golden Brain" award of the Inventors Association, this challenging game is both fun and educational. Your young astronaut must skillfully maneuver a miniature satellite that floats on jets of air through space loops positioned around the lunar surface course. Operator controls the air flow and direction to execute maneuvers. Requires 3 "C" batteries (not included).

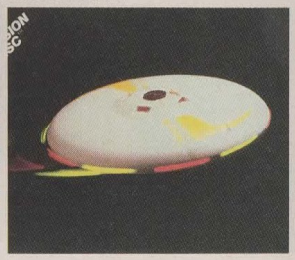
E38,416 $29.95



THE SCIENCE OF "BUBBLE-OLOGY"

Make giant bubbles, square bubbles, centipede bubbles, a space-sudship and more. Learn bubble science such as the physics of liquid skins, membranes, pressures and jets, the Bernoulli and Venturi effects. Kit includes bubble trumpet, mute (for mini bubbles), super soap concentrate (makes 16 oz. of fluid), mixing container, blow straw and 30 page guidebook.

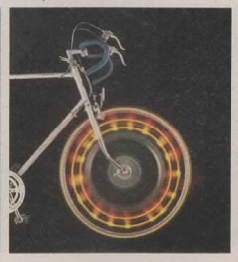
Bubble Blower E38,656 $12.95



ILLUSION FLYING SAUCER

Our aerodynamically-contoured, high-impact flying saucer has pulsing red and yellow light emitting diodes (LEDS) set in the rim. With a flick of your wrist, the 11-1/2" diameter saucer becomes airborne and the pulsations of the lights (approximately 100 per second) produce fascinating optical illusions. The multi-color light images resemble the "portholes of a UFO." Powered by one 9V battery (not included).

Illusion Disc E36,212 $16.95

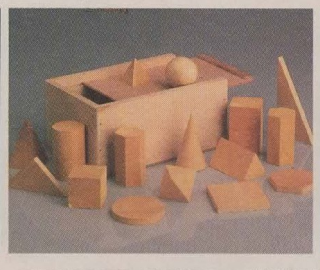


BICYCLE WHEEL LIGHTS

• **Added Safety Benefits**

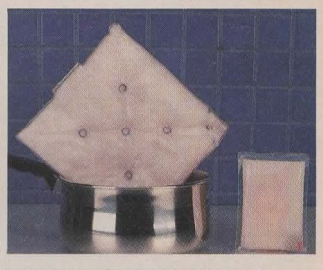
Wheelites™ are a sophisticated electronic lighting system for spoked-wheel bicycles. When your bicycle is in motion, Wheelites™ produce a distinct illusion of a double circle of red and yellow lights. Kit includes: 1 battery unit with two red/yellow light fixtures for each tire. One 9V battery (not included) needed for each battery pack. Easy installation.

E36,992 $24.95



GEOMETRIC SHAPES

15-piece solid hardwood geometric shape set. Approximate size of each piece is 1" to 2". Wood storage box. Shapes included are: sphere, cube, square prism, cone, circle, square, cylinder, octahedron, pyramid, tetrahedron, equilateral prism, hexagonal prism, hexagon, triangle, right triangle. **E38,884 $26.95**



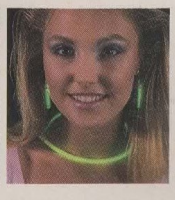
HEAT WAVE™ SUPERCOOLED LAB DEMO

• **Makes Ideal Body and Hand Warmer**

Heat Wave™ is an energy storing and releasing system designed to provide warmth (approx. 130°F) which contains a super-cooled salt solution (sodium acetate and water). To activate, gently flex the stainless disc inside; this starts the heat of fusion, changing from liquid to a solid. Thermodynamic energy is released for 45 minutes to three hours. Can be used many times. To recharge, simply boil in water. Full instructions included.

4 oz. Hand Warmer. 3"x4" **E38,687 $4.50**

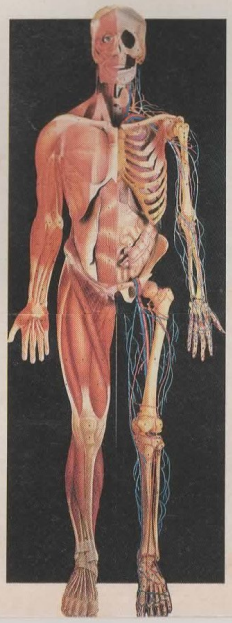
1-1/2 lb. Body Warmer. 7-1/2"x7-1/2" **E38,883 $24.95**



CYALUME™ CHEMICAL LIGHT STICKS

Just snap the tube mixing the two chemicals, together. Non-toxic, non-flammable, non-corrosive, waterproof, safe plastic construction.

Economy Package of 10 Green 4"-8 Hour E37,217 $16.95
Pkg. of 6 High Intensity Yellow-30 Minute E34,879 $15.95
12 Hour—6" General Purpose:
Green-Pkg. of 10 E37,218 $23.95
Red-Pkg. of 10 E37,219 $23.95
Orange Pkg. of 10 E37,220 $23.95
8 Hour—6" General Purpose:
White-Pkg. of 10 E37,221 $23.95
Blue-Pkg. of 10 E37,222 $23.95
Mini 1-1/2" Tubes. Add to fishing lure or use as a replacement for your earrings. Make your own jewelry. 6 Hours.
Yellow-Pkg. of 12 E34,880 $12.95
Blue-Pkg. of 12 E37,223 $12.95
Hot Pink-Pkg. of 12 E37,224 $12.95
Mid-SizeTubes: 3"x 5/16" dia. tubes, hole for hanging.
Green Only. Pkg. of 10 E37,568 $21.95
Jewelry Kit. Pkg. of 4 items: 1 ring, 1 pair of clip-on earrings, 1 bracelet and 1 necklace. 6 Hours.
Blue Kit E37,225 $7.50 Green Kit E37,226 $7.50
Cocktail Stirrers. Green 6 hour. Package of 10 E37,227 $9.95



DIMENSIONAL MAN

Six feet tall, half skeletal, half muscular, Dimensional Man is a life-size pop-up figure which provides an unprecedented introduction to the human body. With five simple actions, Dimensional Man quickly and easily becomes a spectacular and informative wall chart, offering a colorful, three-dimensional view of the inner structure of the human body. Two simple motions will reveal the heart and lungs, as well as the entire upper and lower abdominal region. With realistic and detailed renderings of the cardiovascular, respiratory, digestive, locomotor and urogenitary systems of the body, the figure comes with an index identifying 304 bones, muscles, organs, arteries and veins. Fascinating and instructive, by David Pelham.

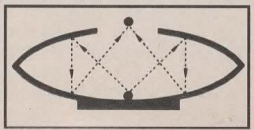
Dimensional Man E38,882 $34.95

MIND BOGGLING OPTIC MIRAGE®

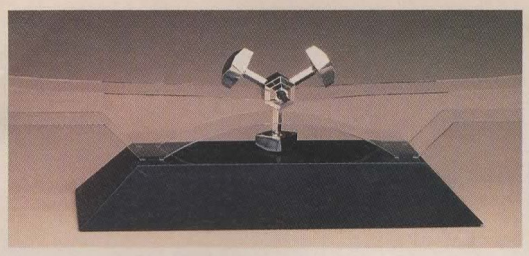
• **Now You See It. . .But It's Not There**

Try and touch the object that appears on top of this fascinating optic mirage disc. . .there is nothing there. The object actually is below. Displays an unusual parabolic optical effect. 9" diameter. Even when photographed, the object appears to be on top.

Optic Mirage® E72,381 $42.95



Observe the path of light rays as they construct a three-dimensional Image of a marble.



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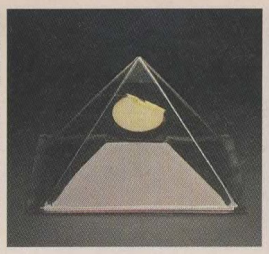

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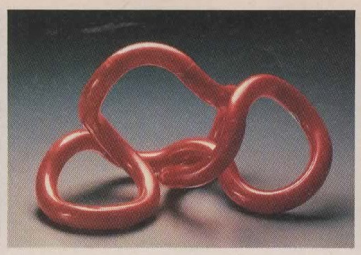
Can it unlock the mysteries of energy and aging? Explore its potential. Clear acrylic pyramid is the same dimension (in scale) as the great Pyramid in Egypt. Approximately 6" x 9-1/4" x 9-1/4" size. Has interior platform. With instructions and pyramid facts.

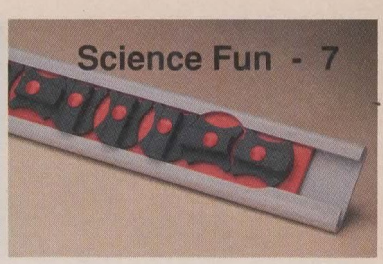
Pyramid E71,817 $39.95



C) TANGLE™ SCULPTURE

Tangle™ is a movable, 3-dimensional kinetic structural form based on the concept of infinity. Made out of rotating connected links, it can easily be twisted, turned, bent and shaped. Made of durable red plastic.

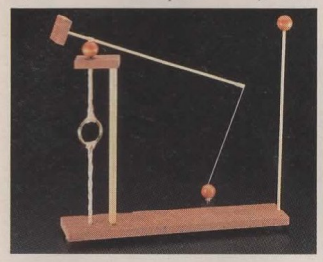
Tangle™ E37,481 $15.95



D) SPIN-OUT™ PUZZLE

The idea is simple: just turn the disks at the indicated spot, one by one. When the disks are all turned sideways, the slide will unlock from the base and can be removed. Beware: it's tougher than it looks. Spin-Out™ will have you going in circles for hours. Invented by William Keister, a pioneer in telecommunications switching system theory and design.

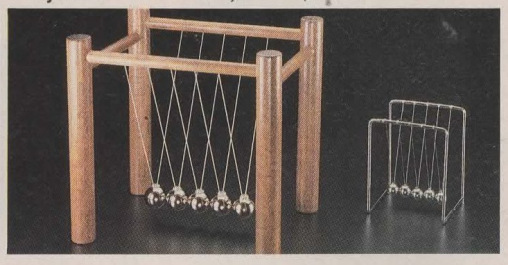
SPIN-OUT™ Puzzle E37,902 $10.95



GET INTO THE SWING OF THINGS

This fascinating toy actually demonstrates the physics of energy and motion. Carefully crafted in rich, oil finished wood. Metal parts. Easy to assemble friction-fit parts. As much fun to put together as it is to watch.

Perpetuo E42,634 $7.95



SWINGING WONDER BALANCE BALLS

A conversation piece you can't resist. Swing one of the five nickel-plated balls and one on the other side swings back. Demonstrates motion laws.

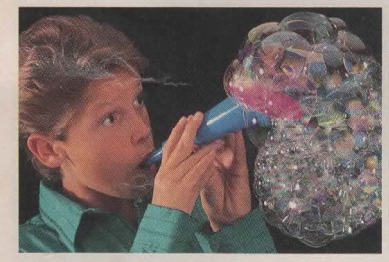
Large Balance Ball. 9" L x 9" H x 7" W. Wood frame. **E33,739 $22.95**

Medium Balance Ball. 3-1/2" L x 4-1/2" H x 3-1/4" W. Chrome frame. **E37,901 $4.95**

"SPACE": THE GAME THAT DEFIES GRAVITY

Winner of the "Golden Brain" award of the Inventors Association, this challenging game is both fun and educational. Your young astronaut must skillfully maneuver a miniature satellite that floats on jets of air through space loops positioned around the lunar surface course. Operator controls the air flow and direction to execute maneuvers. Requires 3 "C" batteries (not included).

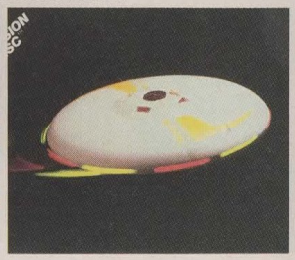
E38,416 $29.95



THE SCIENCE OF "BUBBLE-OLOGY"

Make giant bubbles, square bubbles, centipede bubbles, a space-sudship and more. Learn bubble science such as the physics of liquid skins, membranes, pressures and jets, the Bernoulli and Venturi effects. Kit includes bubble trumpet, mute (for mini bubbles), super soap concentrate (makes 16 oz. of fluid), mixing container, blow straw and 30 page guidebook.

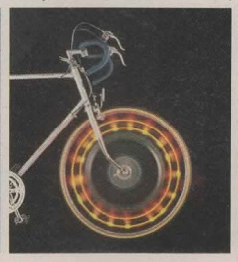
Bubble Blower E38,656 $12.95



ILLUSION FLYING SAUCER

Our aerodynamically-contoured, high-impact flying saucer has pulsing red and yellow light emitting diodes (LEDS) set in the rim. With a flick of your wrist, the 11-1/2" diameter saucer becomes airborne and the pulsations of the lights (approximately 100 per second) produce fascinating optical illusions. The multi-color light images resemble the "portholes of a UFO." Powered by one 9V battery (not included).

Illusion Disc E36,212 $16.95

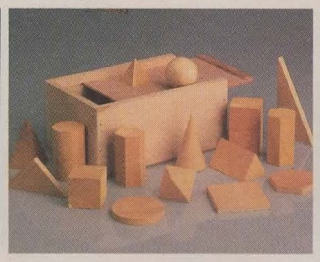


BICYCLE WHEEL LIGHTS

• Added Safety Benefits

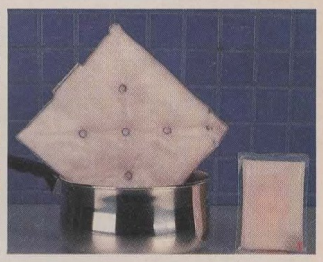
Wheelites™ are a sophisticated electronic lighting system for spoked-wheel bicycles. When your bicycle is in motion, Wheelites™ produce a distinct illusion of a double circle of red and yellow lights. Kit includes: 1 battery unit with two red/yellow light fixtures for each tire. One 9V battery (not included) needed for each battery pack. Easy installation.

E36,992 $24.95



GEOMETRIC SHAPES

15-piece solid hardwood geometric shape set. Approximate size of each piece is 1" to 2". Wood storage box. Shapes included are: sphere, cube, square prism, cone, circle, square, cylinder, octahedron, pyramid, tetrahedron, equilateral prism, hexagonal prism, hexagon, triangle, right triangle. **E38,884 $26.95**



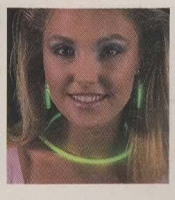
HEAT WAVE™ SUPERCOOLED LAB DEMO

• Makes Ideal Body and Hand Warmer

Heat Wave™ is an energy storing and releasing system designed to provide warmth (approx. 130°F) which contains a super-cooled salt solution (sodium acetate and water). To activate, gently flex the stainless disc inside; this starts the heat of fusion, changing from liquid to a solid. Thermodynamic energy is released for 45 minutes to three hours. Can be used many times. To recharge, simply boil in water. Full instructions included.

4 oz. Hand Warmer. 3"x4" **E38,687 $4.50**

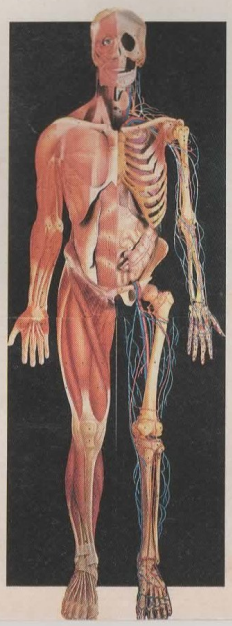
1-1/2 lb. Body Warmer. 7-1/2"x7-1/2" **E38,883 $24.95**



CYALUME™ CHEMICAL LIGHT STICKS

Just snap the tube mixing the two chemicals, together. Non-toxic, non-flammable, non-corrosive, waterproof, safe plastic construction.

Economy Package of 10 Green 4"-8 Hour E37,217 $16.95
Pkg. of 6 High Intensity Yellow-30 Minute E34,879 $15.95
12 Hour—6" General Purpose:
Green-Pkg. of 10 E37,218 $23.95
Red-Pkg. of 10 E37,219 $23.95
Orange Pkg. of 10 E37,220 $23.95
8 Hour—6" General Purpose:
White-Pkg. of 10 E37,221 $23.95
Blue-Pkg. of 10 E37,222 $23.95
Mini 1-1/2" Tubes. Add to fishing lure or use as a replacement for your earrings. Make your own jewelry. 6 Hours.
Yellow-Pkg. of 12 E34,880 $12.95
Blue-Pkg. of 12 E37,223 $12.95
Hot Pink-Pkg. of 12 E37,224 $12.95
Mid-SizeTubes: 3"x 5/16" dia. tubes, hole for hanging.
Green Only. Pkg. of 10 E37,568 $21.95
Jewelry Kit. Pkg. of 4 items: 1 ring, 1 pair of clip-on earrings, 1 bracelet and 1 necklace. 6 Hours.
Blue Kit E37,225 $7.50 Green Kit E37,226 $7.50
Cocktail Stirrers. Green 6 hour. Package of 10 E37,227 $9.95



DIMENSIONAL MAN

Six feet tall, half skeletal, half muscular, Dimensional Man is a life-size pop-up figure which provides an unprecedented introduction to the human body. With five simple actions, Dimensional Man quickly and easily becomes a spectacular and informative wall chart, offering a colorful, three-dimensional view of the inner structure of the human body. Two simple motions will reveal the heart and lungs, as well as the entire upper and lower abdominal region. With realistic and detailed renderings of the cardiovascular, respiratory, digestive, locomotor and urogenitary systems of the body, the figure comes with an index identifying 304 bones, muscles, organs, arteries and veins. Fascinating and instructive, by David Pelham.

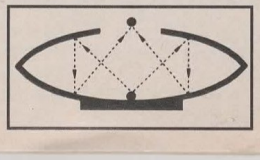
Dimensional Man E38,882 $34.95

MIND BOGGLING OPTIC MIRAGE®

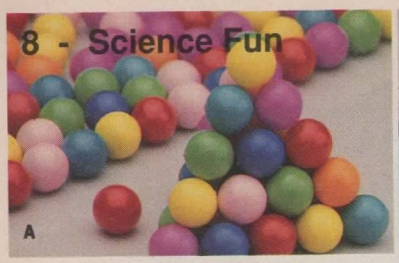
• Now You See It. . .But It's Not There

Try and touch the object that appears on top of this fascinating optic mirage disc. . .there is nothing there. The object actually is below. Displays an unusual parabolic optical effect. 9" diameter. Even when photographed, the object appears to be on top.

Optic Mirage® E72,381 $42.95



Observe the path of light rays as they construct a three-dimensional Image of a marble.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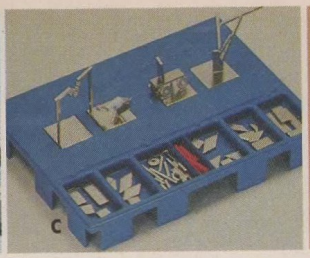
C

D

E

F

A) MAGNETIC MARBLE MAGIC
Build a mountain, pyramid, geometric pattern and more. High impact plastic marbles have a strong magnet inside. Positive and negative poles. Build shapes and designs through the principles of magnetism. 1/2" in diameter. Assorted colors. 5 Years and Up.
Package of 20 E34,968 $3.95
5 or More of Above, $3.70 Each
10 or More of Above, $3.20 Each
Package of 50 in Drawstring Bag.
Instruction booklet E37,623 $12.95

B) BAG OF MAGNETS
• Instant Science Table/Project
Sack of 50 magnets in assorted sizes, shapes and pull capabilities. Includes three stacking poles and base.
Bag of Magnets E1303 $12.95

C) MAGNASTICKS MAGNETS
Create abstract sculptures and vertical designs. Over 90 assorted metal shapes firmly grip the magnetic plates embedded in the 14" x11-1/2" plastic platform. Five and up.
Magnasticks E72,519 $25.95

D) MARVELOUS MAGNETIC BALLS
Nutty magnetized marbles which roll in crazy directions, providing endless entertainment. Teach the principles of magnetism. **E60,508 $2.95**

E) MAGNET SET
Set of two horseshoe magnets with keepers—one large heavy-duty 3-1/2 inch magnet and one 2-1/2 inch magnet. Ideal way to teach the principles of magnetism **E37,907 $5.50**

F) POWERFUL GIANT MAGNET
9-1/2" horseshoe It's easy for children to hold and comes with a keeper bar to lengthen the magnet's life. **E37,016 $4.95**

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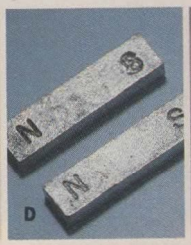
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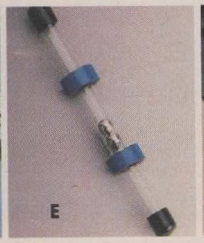
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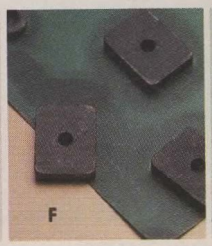
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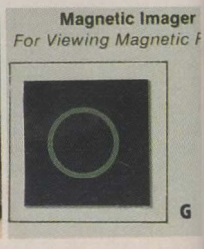

G

A) N/S POLE BAR MAGNET WITH SWIVEL STAND
• Demonstrate Compass Action
Heavy duty bar magnet (6" L x 3/4" W x 1/4" T) and precision pinpoint pivot rotation stand are ideal to demonstrate magnetic principles. Stand is transparent, for use on overhead projector. Magnet poles clearly labeled. **E38,028 $19.95**

B) N/S POLE MAGNET (ALONE)
Package of 2 E40,421 $9.50
1 Lb. of Iron Filings E60,176 $6.50

C) SPACE-TRIX MAGNET SET
Perform over 7 different mystifying action demonstrations such as the "floating in air magnet." Kit includes 3 ceramic disc magnets with center hole and directions. **E38,736 $4.95**

D) ALNICO BAR MAGNETS
Two powerful, zinc-plated magnets. 2" L x 1/2" W x 1/4" Thick. N-S poles are clearly marked. **E37,908 $7.25**

E) BUMPER BALLS ARE UNIQUE
A puzzle when unsolved, when solved it demonstrates the principle of conservation of momentum. The trick is to get it into the solved state. **E36,922 $4.75**

F) DEMONSTRATE MAGNETIC FIELDS & FORCES KIT
Includes our Bag of 50 assorted Magnets and a 4" x 4" piece of magna-view film. Demonstrate pole patterns of a magnet / motor / electro magnet.
Bag of Magnets Kit Reg. $23.95 E37,622 $16.95

G) MAGNETIC IMAGER • View Magnetic Fields
Kit includes a 3/4" dia. ceramic disc magnet and 1" x 1" square piece of magna-view film. Display magnetic pole patterns from magnets, compasses, electro-magnets and certain motors. **E37,906 $6.75**

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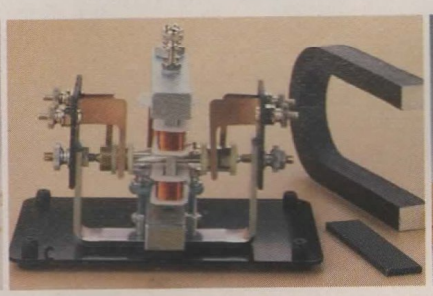
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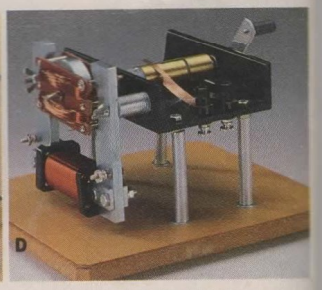
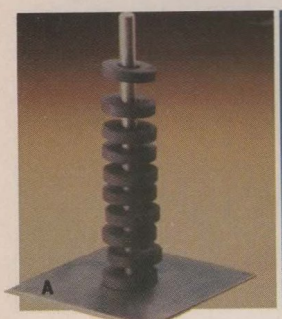

D

A) MAGNETIC GAMES
This assortment includes a 20 pound lift capacity plastic magnet and four games. Doodle Balls picture maker, construction site Magnetic Dozer, Super Darts target game and Dapper Dan. **E35,853 $19.95**

B) STUDENT MAGNET WORK STATION
• 10 Different Magnets
Includes magnetic wand, ceramic block magnet, 1" cup magnet, 6 assorted ceramic magnets, magnetic viewing paper, 6" dowel, string & activity sheet. Plastic case with metal base for storage. Instructions included.
Student Magnet Kit E38,737 $14.95

C) MOTOR GENERATOR
Similar to a St. Louis Motor, but capable of DC and AC operation. May be operated as a magneto, series motor, shunt motor, series generator and shunt generator. Horseshoe magnet and electromagnet included. Base 6" L x 4" W; stands 4-1/2" H; magnet 5-1/2" L x 3" W. **E36,255 $79.95**

D) MILLER-COWAN GENERATOR
Ideal for studying the production of alternating and direct current as well as electric motor theory. Operable as a separately or self-excited generator and as a series, shunt, or compound motor. Open construction for viewing ease. **E36,251 $185.00**
Generator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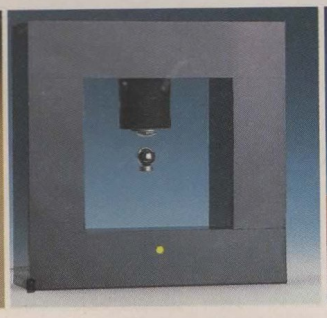
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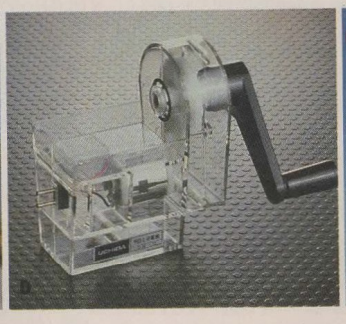
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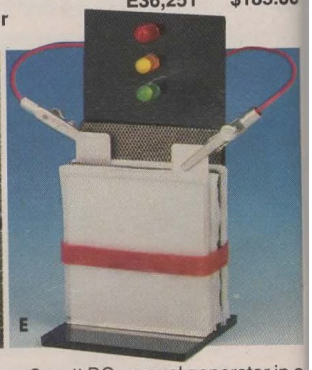

E

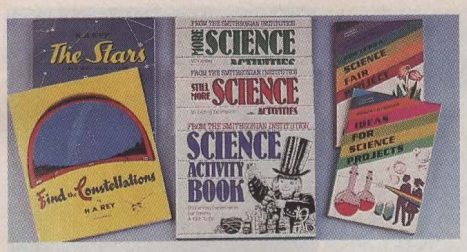
A) FLOATING MAGNET DISPLAY
Aluminum display stand demonstrates magnetic principles. When magnets are arranged on the center pole with opposing magnetic fields, they will float in space. Display includes 10 ceramic 1-1/4" dia. x 1/4" thick magnets. Stand is 6" tall with 4" square base. **E38,102 $23.50**

B) NEWTON'S FOLLY™
• Demonstrate Opto Electric Feedback Control
This device keeps a small floating magnet in mid-air indefinitely. The electrical control device uses stepped magnetic fields to accomplish this amazing feat. The electro magnet and the power supply are built into the design of the unit. (Hint: infrared detectors act as a sensor instructing the electro magnet to step its field). Black plastic housing. 7" x 7" x 2" .
Newton's Folly™ E36,216 $119.00

C) PRECISION MACHINED ALUMINUM GYROSCOPE
Heavy duty all metal demonstration device with adjustable Teflon bearings. Dynamically balanced for maximum momentum. **3" Classroom Gyroscope.** Consists of a 2-1/4" diameter x 1/2" thick rotor with machined bearing points, adjustable Teflon bearings mounted in a 3" diameter ring frame. Accessories included are gimbal cradle and rocker base. Will run up to 5 minutes per spin. Full directions . Weighs 9 oz. **E36,249 $49.95**

D) HAND CRANK ELECTRICAL GENERATOR
Hand-operated DC generator is a high performance apparatus that can generate up to 10 volts and 300mA of electrical power. Includes one 3-watt DC manual generator in a clear plastic case, 4-1/2" L x 2-1/4" W x 4-1/4" H, with gears and crank, 3 ft. electrical cord with alligator clips, and instructions.
Hand Crank Generator E38,029 $49.95

E) BUILD-A-BATTERY KIT
Assemble the plastic and aluminum alloy plates, 3 LED's (small bulbs), wires and alligator clips, add some salted water and you have a reusable, 2-volt battery! Safe experiments; activities guide. Ages 9 and up, with adult guidance.
E38,738 $21.95 2 or More, $19.95 Each



SCIENCE FAIR PROJECT BOOKS

A. "HOW TO DO A SCIENCE FAIR PROJECT", by S. Tocci, 128 pages, soft cover, 10 Years and up. General advice on selecting a topic, planning, the Scientific Method, reporting, analyzing, graphing, presentation and exhibition, plus sources for materials.
E4587 $5.95

B. "IDEAS FOR SCIENCE PROJECTS" by R. Gardner, 144 pages, soft cover, 10 years and up. A more specific guide to actual project ideas in astronomy, light, chemistry, physics, heat, electricity, body and mind and animal science. **E4588 $5.95**

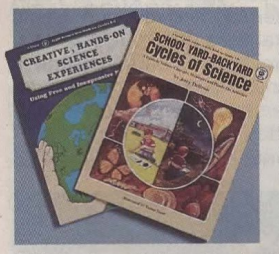
C. THREE SCIENCE ACTIVITY BOOKS from the Smithsonian Institution for the elementary level science student. Written to be used as a supplement to the elementary classroom curricula, as a "Take Home Assignment with Parents" or at home as a unique opportunity to actively participate in your child's discovery learning. Each book contains 20 science activities for the younger child that encourages all kinds of questions and answers. Materials for each project can be found in the home. **$9.95 Each**

Book #1 - Science Activity Book E4491
Book #2 - Still More Science Activities E4493
Book #3 - MORE Science Activites E4492

D. Two wonderful introduction to astronomy books by H.A. Rey for the elementary grade level.

1."The Stars" 160 pages. Soft cover. Comprehensive sky guides with detailed descriptions of the shapes in the sky, contellations, movements of the stars throughout the year and answers to many "whys" and "hows".
E4114 $11.95

2."Find The Constellations" 72 pages, soft cover. A well illustrated star atlas for the young astronomer.
E4113 10.95



CREATIVE, HANDS-ON SCIENCE EXPERIENCES
Contains hundreds of interdisciplinary hands-on science activities using free and inexpensive materials - biological, physical, earth and space science activities. Over 300 starter activities. Grades K - 6. 256 pp. Recommended for Science Fair Students. **E4554 $18.95**

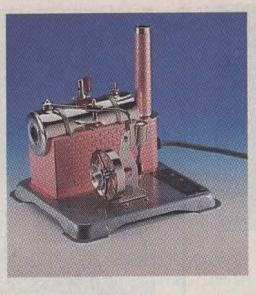
SCHOOL YARD-BACKYARD CYCLES OF SCIENCE BOOK • For the Teacher
Features convenient reproducibles on physical, biological, earth and space science activities. Major emphasis is placed on starter activities, designed to prompt children to ask "why" or "what". 100 reproducible school-home activities! Tips for Parents guide, teacher tips and answer key included. Grades 3 - 9+. 160 pp.
Backyard Science E4555 $13.95

THE "TAB" SCIENCE FAIR SERIES
A rich source of project ideas for teachers, parents and youth leaders to introduce to children ages 8 through 13. Written and compiled by Robert L. Bonnet and G. Daniel Keen.

49 Science Fair Projects $9.95 Each
Botany E4560 Earth Science E4561
Environmental Science E4562 Computers E4563
Botany II (49 More) E4564

4 Physics Books by Robert W. Wood, a commercial pilot and electromechanical technician. The Physics for Kids Ages 8 to 13, with hands-on instruction in basic areas of physics: heat, mechanics, light, electricity and magnetism. Quick, safe and inexpensive, the projects in these books produce results in less than 30 minutes (making them great for science class!) and require only common household items. **$9.95 Each**

49 Easy Experiments
With Heat E4568 With Mechanics E4569
With Optics E4570 With Electricity & Magnetism E4571

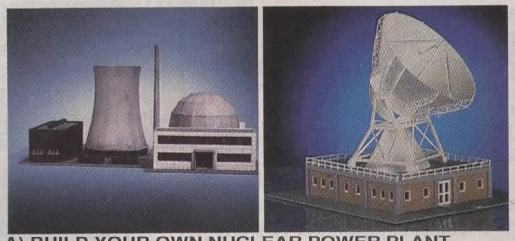


EDUCATIONAL MODEL ELECTRICALLY POWERED STEAM ENGINE
Safe, no-open-flame model is ideal for classroom or demonstration use. Horizontal boiler, double acting oscillating cylinder. Overall height 9". Solid brass boiler 2-1/2" dia. x 6"L nickel plated and polished, electrically heated and equipped with water gauge, safety valve, whistle and two speed power take-off pulley. The double acting oscillating brass cylinder engine with 3" diameter fly-wheel is vertically mounted on a nickel plated bracket. Cylinder 1/2" dia. bore 9/16" stroke. Throttle valve controls speed of engine. With 6 feet of heavy duty heater cord and mounted on 8-3/4" x 9-1/4" metal base.
Steam Engine E70,822 $110.00

HOT AIR STIRLING CYCLE ENGINE
Build and operate a safe (non pressurized) Stirling engine that runs at speeds to 1,000 RPM. Colorful all-metal desktop model contains precision machined parts. 7-1/2" x 4". Comes with dry fuel, fuel platform, assembly instructions and a plaque to identify the builder. Requires only common hand tools and lightweight oil.
E33,775 $69.95

BIG BANG CARBIDE CANNONS • Since 1912
Model cannons discharge with a loud resounding bang and a realistic flash. Ideal for holiday celebrating. . . especially July 4th! Operates on same basic principle as a gas engine. Charger drops a measured amount of Bangsite Ammo (calcium carbide) into water in the gun to generate combustible gas. Push igniter and gas goes off with a loud report. Powdered ammunition cannot be ignited dry by flame or concussion. Both feature cast-iron body and include one tube of ammunition (approx. 100 shots).
WARNING: CAN NOT BE SOLD TO NJ RESIDENTS. ADULT SUPERVISION REQUIRED.

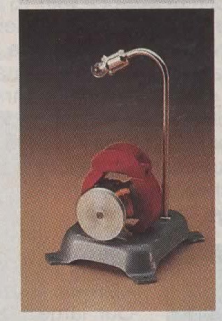
A. 60mm Light Field Cannon: Single shot action, cannon measures 9" long overall. **E36, 821 $37.95**
B. 155mm Major Field Cannon: Automatic action, cannon has 10-1/2" body plus 17" muzzle. **E71,654 $95.00**
Bangsite Ammunition. 2 tubes **E41,005 $7.95**



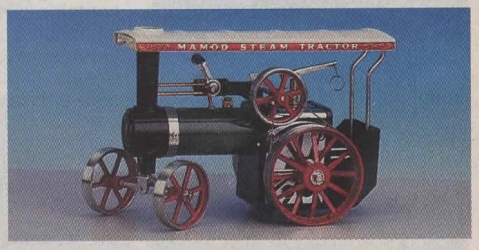
A) BUILD YOUR OWN NUCLEAR POWER PLANT
Based on Three Mile Island, this detailed 1/160 "N" scale kit has 79 parts molded in colors. Includes containment building, cooling tower and generator station on a 14"L x 6-1/4"W base. Stack is 4-3/4"H. Full instructions and information on functions of nuclear generators. Recommended for ages 12 and over; requires glue (not included).
Nuclear Plant Model E36,718 $15.95

B) RADIO SATELLITE RECEIVER DISH SCALE MODEL
Based on the giant dish antennas used by government and communications industry to receive radio signals from orbiting satellites. Detailed HO scale (1/87=inch) kit is molded in colors. Includes platform, base building and 360° rotatable dish with 90° up/down tilt. Measures overall 8"Wx7"Lx7-1/2"H. Recommended for ages 12 and over, requires glue (not included).
E37,401 $14.95

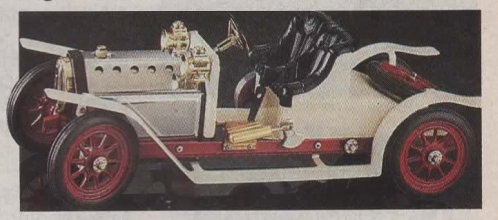
DRY FUEL ENGINE
Replica of single action engine of the 1700's. Fast-slow operating throttle valve, water gauge, whistle, safety valve, power take-off pulley to drive accessories. All metal parts. Requires hammer, plier and screwdriver to assemble. 7-1/4" square platform. 8-1/4" high. Ages 10 and over.
Engine E72,202 $74.95
20 Pellets E42,324 $6.95



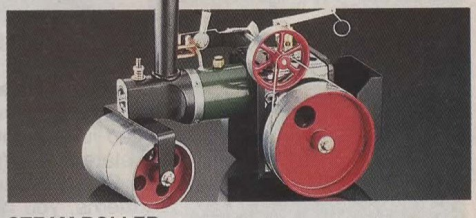
GENERATOR AND LAMP
Designed as an accessory for steam engines, it will operate off of any motor. At approximately 1500 rpm it produces enough electricity to light up a 3.8 volt flashlight bulb in a nickel plated standard. It has a V-grooved pulley for belt drive and is mounted on a blue enameled metal base 3" x 4-1/2". H. overall 6"
E37,418 $59.95



LIVE STEAM TRACTION ENGINE TRACTOR
Attractive model English traction engine. Fitted with reverse control, whistle, boiler sight glass and steering extension. 10" long. Fully-assembled. Runs on dry fuel tablets (included) Heavy-gauge brass and steel body.
Engine Tractor E72,545 $140.00

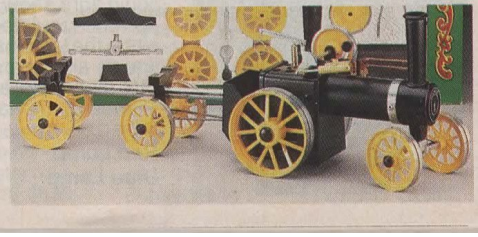


STEAM ROADSTER
Magnificent model capturing Edwardian elegance. This beautiful Roadster has reverse control for extra realism. A boiler sight glass is fitted and a steering extension is provided. 15-1/2" long. Dry fuel tablets included.
Assembled Roadster E35,926 $220.00
Roadster Kit E38,382 $175.00



STEAM ROLLER
Realistic model driven by efficient steam engine. Fitted with reverse control, whistle, boiler sight glass and steering extension. **E35,930 $140.00**

TRACTOR AND WAGON KIT
Dry pellet-produced steam powers this tractor and wagon that you build easily. The finished tractor has forward and reverse controls and is fitted with a whistle for the authentic steam sound of yesteryear. Precision machined steel parts. The overall length of tractor and wagon is 25"; 5" wide. Black, silver and yellow finish. 20 dry fuel pellets and lubricating oil. **E35,923 $140.00**

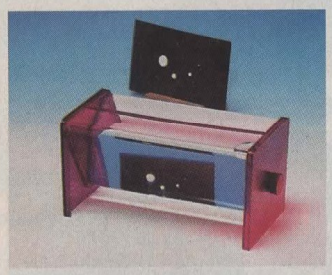


OUR FAVORITE 15 DISCOVERY TOYS

• Fill up a Giant Stocking

Discover the fascinating world of Science with 15 different toys that teach while you have fun! Each individual toy teaches a basic scientific principle and provides hours of amazing fascination. Grow a Magic Crystal Tree, taste Astronaut's Ice Cream, defy gravity with Luna Balls, create your own mini-tornado, mix up Moon Blob slime, see the rainbow from a prism, watch glow-in-the-dark bedroom stars, create sunprint photos, hatch Mini-Sea Monkeys, dazzle with a Flashing Yo-Yo, snake along with Slinky Jr., pop up our Jumping Discs, observe the spectrum with Rainbow Glasses, explore magnetic forces and observe the microscopic world. A $40 value. . . save $10 and make a young scientist very happy.

15 Discovery Toy Package E5056 $29.95

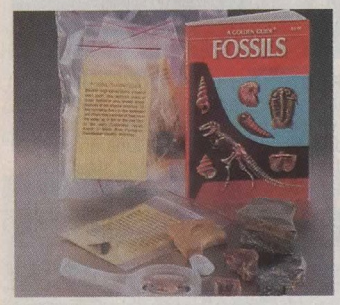


GIANT ACRYLIC WATER PRISM

• Create Giant Spectrums

Our large 5"x10" acrylic water prism and kit contains all you need to explore the science of prismatic color and light diffraction. Recreate Goethe's famous experiments (1792-1810). Create giant spectrums and experiment with different liquids. Kit includes acrylic prism, 8 test cards, wooden holder and a 16-page instruction booklet with over a dozen foundation experiments and suggestions for more.

Water Prism E38,421 $19.95



ES FOSSIL COLLECTOR'S KIT

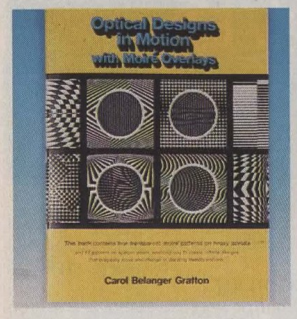
A complete introduction to the life of the past as revealed through fossils. Our fossil kit includes 12 authentic fossils and a geological time scale chart. Each specimen is individually packaged with complete identification and dating information. Fossils range from 50 to 550 million years old. Kit contains one each of: fish, gastropod, crinoidstem, wood, horn coral, pelicypod, shark tooth, turritella, algae, and 2 trilobites. A 3X hand-held acrylic magnifier and Golden Guides Popular Fossil Identification Book is included for further research and study.

Fossil Kit E38,419 $24.95

SUNPRINT PAPER KIT

Make photographic prints with the aid of sun and water. Sunprint paper undergoes a chemical change when exposed to light. Prints are made in five minutes. Includes acrylic sheet, 24 print sheets (8" x12" size) and instructions. Ideal for the budding photographer and artist.

Sunprint Kit E33,743 $10.95



OPTICAL DESIGNS IN MOTION WITH MOIRÉ OVERLAYS

• By Carol Belanger Grafton

Produce your own moiré effects in motion. All you need is included: 81 optical-art patterns, plus an acetate screen (provided inside the front cover) with four moiré overlays. By moving the screen over the patterns, you obtain interesting wavelike effects. Cut the acetate into its four components and superimpose the strips over the patterns, creating double and multiple moirés. The last two pages of the book can also be cut out and made into a viewer, enabling you to isolate specific effects. Although the designs are strictly black and white, you will often see surprising illusions of color. 27 pages. Paperbound.

Moire Overlay Book E31,266 $6.95

CLASSIC 1960'S LAVA LITE

Lava Lite is a continuously changing captivating liquid light show. Two chemically insoluable liquids are encapsulated in a glass tapered column which sits in the lamp base. The 40 watt bulb illuminates the liquids and heats them, changing their viscosity so that blobs rise as they warm and fall as they cool. Stands 16-1/2" tall with 4-1/2" diameter base. Weighs 5 lbs.

Red Lamp E38,634 $59.95
Blue Lamp E38,635 $59.95

RADIOMETER. . .A SOLAR ENGINE

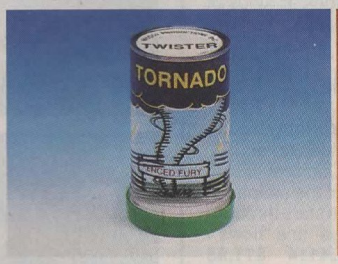
Radiometer's four vane rotor spins continuously at up to 3,000RPM from heat of sunlight or an incandescent bulb. The silvered model is a hemispherical mirror (1/2 of the glass globe surface) which allows you a panoramic view of everything behind and around you. Each is 5" high, 3" dia. Vane spins on low-friction, needle-point bearing in partial vacuum glass globe.

Silvered Radiometer E60,529 $12.95
Plain Glass Radiometer E60,082 $6.95

HANGING RADIOMETER

Ideal for hanging in sunny windows, under incandescent lamps or even as a Christmas Tree ornament. Bulb is 3" dia. x 4" high, comes with bendable wire hanger and wire stand for table mount.

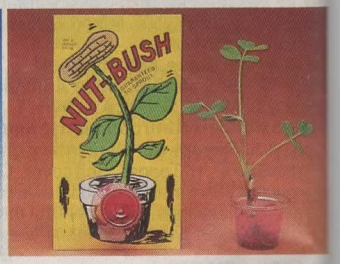
Hanging Radiometer E38,510 $10.95



THE PET TORNADO

The mystery and beauty of nature's most destructive force can now be brought home in a bottle via The Pet Tornado. A clear plastic cylinder, 3-5/8" H x 2" Dia., with "Tornado Juice" sealed within. When shaken per directions, a miniature tornado forms inside the bottle.

Tornado E38,835 $4.95



GROW A PEANUT BUSH

Includes spanish peanut seed, starter cup and red yarn. Roots guaranteed to sprout in 2 days. Grows for months if transplanted. Peanuts form underground on the end of spikes sent down from a faded flower. Pkg. of 3 kits.

Peanut Bush E39,134 $4.95

A GALAXY OF GLOW-IN-THE-DARK STARS

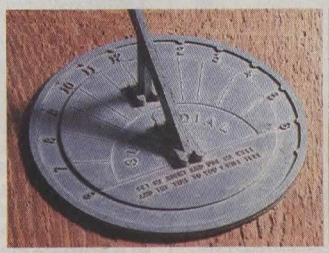
Turn any ceiling or wall into a brilliantly lit night sky with 250 glow-in-the-dark stars. Star decals vary to 1" diameter; glow brightly after exposure to light. Includes star chart and instructions.

E9521 $4.50

USE NATURE FOR ENERGY

Solar Energy Kit allows you to boil water, cook food or experiment with solar energy with a 6-3/4" parabolic reflector and build a working sundial. Kit includes reflector, support stand, test tube and holder, sundial and instructions. Ages 8 and up.

Solar Oven E42,427 $9.95



SUNDIAL

This timepiece tells sun time as opposed to mean time. A handy chart is provided to calculate the difference. 4-1/2" diameter dial is cast in weather-resistant zinc.

Sundial E33,746 $6.95

SOLAR SHUTTLE

Exposed to sunlight, shuttle flies to the sky. You control this 10' x 2' (when inflated) dirigible by a string. Black; 2 oz.

Shuttle E35,864 $4.95
2 or More, $4.95 Each

BUILD YOUR OWN HOT AIR BALLOON

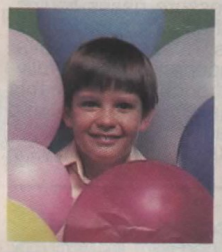
An ideal aeronautical science fair project for the class, the family or your club. These colorful red and white balloons are easy to assemble and can be repaired if damaged. Includes ten pre-cut panels of #1 grade model tissue paper and 14 gauge wire for the bottom ring. Balloons ascend to about 200 feet on string tether when inflated with hot air from a gas torch or "trash can fire." Adult supervision is required. Can lift objects weighing up to about 1/2 pound.

12 Foot Balloon Kit	**E31,333**	**$17.95**
9 Foot Balloon Kit	**E60,691**	**$12.95**
6 Foot Balloon Kit. Pkg.of 2	**E71,866**	**$16.95**

GIANT WEATHER BALLOONS

Ideal for meteorologists, science projects, grand openings, church fairs, aerial photos, etc. Neoprene uninflated thickness—0.005" , inflated thickness—0.002" . Light tan. Can be painted with water color or latex paint, using a soft brush. Inflate with air from vacuum cleaner or helium. When filled with helium, lift power of 3' balloon is 3/4 lb., 8' balloon is 17 lbs. and the 16' balloon is 137 lbs.

Two 3 Ft. Balloons	**E41,755**	**$18.95**
One 8 Ft. Balloon	**E60,568**	**$14.95**
One 16 Ft. Balloon	**E72,151**	**$74.95**



A) BALLOONS GALORE!
• The Perfect Solution To Rainy Day Blues

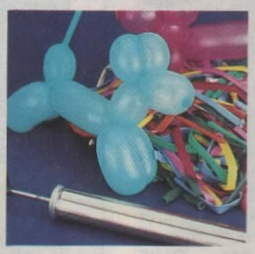
Perk up a party or rainy day with brightly colored balloons. Assortment includes 144 balloons (12 dozen) in child-pleasing colors of red, orange, yellow and blue. Inflate to 11" in diameter. Inflate with helium or vacuum nozzle. Stock up for any occasion.

Balloons Gallore **E42,176** **$15.95**

B) GIANT BALLOONS FOR PLAY OR PARTIES
• Will Enliven Any Party

These brightly colored balloons are perfect for parties, rainy day projects or for children to play with in the yard. For decorations, favors and games. Each package contains four fat balloons in crayon colors of red, yellow, orange and blue. Inflate with helium or vacuum nozzle to three feet in diameter.

3 Foot Balloons **E71,184** **$9.95**



C) BALLOON SCULPTURE PARTY FUN!

Create animals, figures and characters like clowns at the carnival do. Package includes 100 long balloons, 100 round balloons, metal inflator pump and instructional book.

Balloon Sculpture **E35,183** **$33.95**

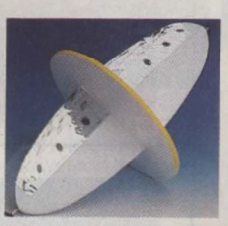
FLYING BIRD FROM FRANCE

This marvelous bird has a 16" wingspan and can fly up to 40 feet in height and a distance of up to 150 feet. Power is supplied by a twist motion of rubber band. Bird can be adjusted for a swooping flight, up or down. Made of strong sun-catching mylar. Durable polypropylene with rubber beak. **E42,720** **$8.95**

PARA CHUTE SPACE BALL

Throw this 2-1/2" durrable plastic ball into the air and it will drift safely back to earth on the 20" diameter parachute that is enclosed within the ball. Fun and educational.

Space Ball **E36,313** **$3.50**



IS IT A UFO?

Invader Turbo Kite makes a cosmic whirring sound at high speed! Wingspan is 24 inches with 14 inch stabilizing saucer. Climbs, darts and dives. Emits bright strobe-like flashes.

Turbo Kite **E72,418** **$6.75**

ARTIST BRUSH ASSORTMENT

42-piece brush set includes a dozen different styles. Wood handles. Fine hair tips suitable for all types of painting. Paint a masterpiece or a yard sale sign. Budget priced.

Brushes **E34,589** **$15.95**

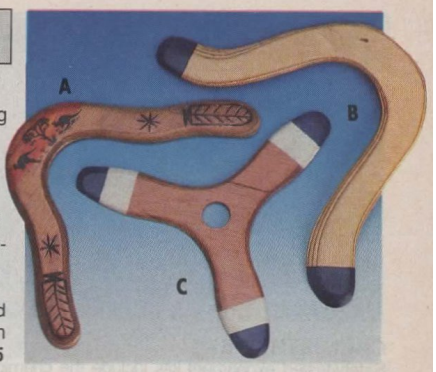
BOOMERANGS

Do you doubt the ability of a boomerang to reverse itself in mid-flight? You won't after trying these authentic all-wood models.

A) Australian Aboriginal. 15" long. **E35,845** **$16.95**

B) Omega Shape. Handcrafted mahogany. 35 yard range. 15" long. **E35,846** **$18.95**

C) Zoom-O-Rang. Three-sided handcrafted mahogany. 11" between points. **E35,847** **$9.95**



PARAFOIL KITE SOARS IN ALMOST ANY BREEZE

Engineered for more stable flight and a lighter pull. No sticks here, just heavy-duty but lightweight spinnaker cloth. Flow Form kite is unbreakable and takes off in only 3-4 mph winds! Shipped ready to fly. Comes with handy rip stop nylon reusable storage pouch.

A) Large Size: 3-1/2' x 4-1/2' **E37,904** **$99.00**

B) Medium Size: 2-1/2' x 3' **E31,190** **$42.95**

C) Small Size: 20" x 28". For slight breezes. **E37,905** **$22.95**

BOOSTER ROCKET

Using air and water, booster rocket blasts off. At flight's peak, returns to Earth. 11-1/2" main section. 6-1/2" pump. Red, white. Virtually indestructible Butyrate plastic. For ages 12 and over.

Booster Rocket **E37,231** **$10.95**

ROCKETRY SCIENCE KIT

• Ideal Group Project
• Ideal Science Fair Project

Complete kit contains 36-page instruction manual, 3 posters, 21" tall 3-stage rocket, remote electrical launcher, launch platform, altitude tracking device, 7 solid propellant engines and supplies for 5 test flights. Adult supervision suggested. (Not available in N.J.).

Rocket Kit **E38,787** **$34.95**

GIANT HELIUM "FLYING FUNSHIP"

Heavy gauge mylar blimp inflates to 4.6 ft. long x 2 ft. diameter when filled with helium (not incl.). Attachable mini gondola houses battery powered (2 "C" batts., not incl.) propeller drive so you can sail your blimp on its tether high over the crowds.

Flying Funship **E37,480** **$49.95**

Helium:
15.2 cu. ft. cylinder. Disposable. Good for two inflations. **E38,643** **$36.95**

PRECISION AIR TOY OF THE 90's Classic "Aerobie". Aerobie has the lowest possible aerodynamic drag consistent with stable flight. 13" diameter ring has inner core of plastic surrounded by a rubber cushion with small "spoiler" lip on the ring's outer edge. Inner diameter is 10";weighs 4 ozs.

E36,013 **$9.95**

Compact Aerobie-10. Aerobie-10 is designed for optimum performance at medium range. 10" diameter ring, weighs 2.1 oz. **E38,116** **$6.50**

BLOW THE WORLD'S BIGGEST BUBBLES

• Makes Bubbles Bigger Than You!
• Uses Ordinary Liquid Dish Soap

Experts have blown a 15 foot sphere, but even beginners can create 5-to-10 foot monsters. Easy to assemble and use. Create giant donuts, corkscrews, snake tubes, giant spheres...all glistening with fantastic colors. Just dip loop into a bucket of soap and water, adjust to the size you want and wave through the air.

Bubble Wand **E37,258** **$9.95**

CHEMISTRY SETS

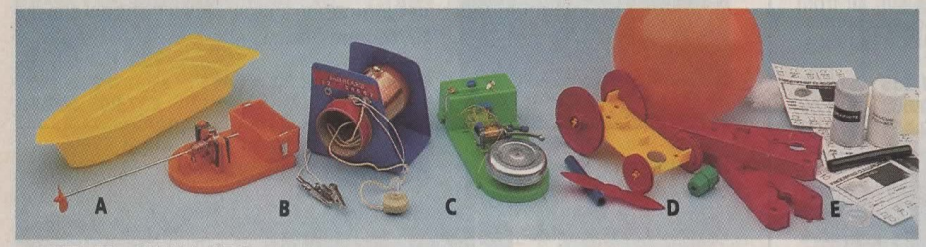
Safety-tested experiment kits include the chemicals and labware necessary to carry out dozens of experiments and projects. Detailed instruction booklet provides step-by-step guidelines. Experiments include: growing crystals; watch distillation in action; make hydrogen and invisible inks; bend glass; watch metal rise from bottom of glass tube. Sets are imported from England. Each set includes racks, heat resistant glass labware, tongs, goggles, chemicals and more.

Recommended for ages 10 and up, with parental or teacher supervision.

A) Beginner Set—50 Experiments
E36,620 $49.95

B) Introductory Set—100 Experiments experiments. E37,815 $62.95

C) Intermediate Set—200 Experiments.
E37,816 $99.95



5 SCIENCE MINI LABS

A) Electric Motor Kit. No tools needed, just curiosity to make the new, more powerful Electric Motor. It's fun to use as it powers its own motorboat. Battery not included.
E37,838 $9.95

B) Crystal Radio Kit. Remember the golden age of radio? This crystal radio kit brings back memories and makes new ones. Build a working crystal radio. Pick up radio stations and experiment with radio waves. No batteries or soldering needed. E37,839 $9.95

C) Electric Bell Kit. The electric bell-buzzer-telegraph introduces the basics of electric circuitry. Use it as a telegraph—change the circuit and use it as a bell or a buzzer.
E37,840 $9.95

D) Mechanics Kit. Open the door to the world of energy, motion and power. The beginning scientist builds a car powered by a mini-jet engine, an action-reaction device, or a propeller. More than 30 experiments in mechanics.
E37,841 $9.95

E) Fingerprint Kit. The junior detective uses tested police methods to discover and preserve hidden fingerprints. With the kit's "Instant Access" classification cards, a complete detective file can be developed.
E37,842 $9.95

ADVENTURES IN SCIENCE - A VALUABLE ADDITION TO SCIENCE CENTERS. GRADES 4+

Each kit includes 35 fun-filled, reproducible project booklets. A selection of nifty equipment and supplies helps students complete the projects. **$11.95 EACH**

A) Light. Prisms, filters, mirrors, & more. E37,843

B) Backyard Science. Study weather, astronomy, insects. With bug viewer, wire and more. E37,844

C) Magnetism. Attract students with the magic of magnets! With magnets, iron filings... . E37,845

D) Kitchen Science. Plants and food. Includes sponge pots, seeds, and more. E37,846

E) Electricity. Explore electrical wonders with light bulbs, socket, copper wire, and more. E37,847

F) Dinosaurs and Fossils. Uncover prehistoric secrets. Includes real dinosaur bone and more. E37,848

G) Sky Science: Construct a solar system, build a weather station. E38,594

H) How Things Work. Simple machines,physics E39,133

I) Spy Science . Encode, decode invisible ink E39,132

J) Eco-Detective. Acid rain, soil testing, solar. E39,130

K) Science Magic Tricks . See spaghetti dance. E39,131

A) MICROCHIP ELECTRONICS

A unique new science kit. Learn about the world of the microchip with over 150 hi-tech electronic experiments including: electro-optics, detector circuits, radio remote control, music synthesizer, motor control & robotics. Ages 10 and up. E37,849 $39.95

B) THE WORLD OF RADIO & ELECTRONICS

200 electronic circuits. Experiments include: 8-key, 16-note organ, electronic sound effects, CB radio converter, 40 computer circuits, 30 electronic games, lie detector, human reflex tester, and over 25 different radio circuits. E37,851 $39.95

C) TECH LAB ELECTRONICS KIT

100-plus precision components with snap-fit assembly. Includes burglar alarm, bell circuit, current amplifier, light dimmer, relay, telegraph, thermostat and many other electric & electronic devices. E37,852 $29.95

D) POWER TECH ELECTRICS

Fun-packed, experiment-packed, easy-to-use, solid, snap-fit construction for ages 8 and up to learn the full story of electricity and how it works in the modern world. 80 experiments teach: electromagnetics, electrostatics, electrochemistry, motor, making batteries, meters, circuits, magnetism, etc. E37,850 $34.95

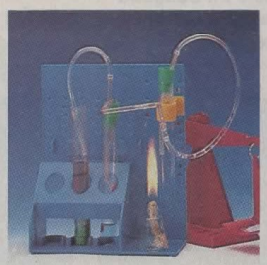
OMNILAB

- **More Than 270 Experiments In Optics—Mechanics—Chemistry—Physics—Geology—Electricity**

The perfect kit to challenge the well-rounded young scientist. Contains the widest and most varied range of scientific experiments of any science kit available today. Everything is included along with easy-to-follow instructions.
Omnilab E37,853 $39.95

GIANT SOLAR LABORATORY

Carry out 150 experiments with this intermediate experimenter's kit. Includes a DC electric motor, 600 milliamp solar cell, 50 micro amp volt meter, solar water heater, parabolic reflector, strobe disc, magnifying glass, thermometer, LEDs, diodes and test tube. Build a solar furnace, electronic thermometer, solar energy mobiles, moire patterns and a stroboscope. Experiment with photo synthesis and producing electricity.
Giant Solar Lab E31,325 $39.95



DISCOVER THE WORLD OF PHYSICS

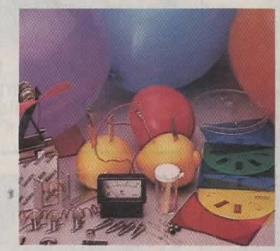
Learn about machines, magnetism, electricity, motors, motion, forces, pressure, gases, liquids, light, heat and sounds. 280 experiments. This kit includes over 100 components and a fully-illustrated book of experiments to help make physics easy and fun. For ages 12 and up.
Physics Kit E72,216 $39.95

3-IN-ONE SCIENCE LAB

Chemistry, Solar Energy, and Microscopy. Chemical magic, the power of the sun, and the fascinating world of tiny things combine to provide a variety of entertainment, education, and astonishment for budding scientists of all ages. Three instructional guides contain directions for extensive experiments plus suggestions for additional scientific projects. Comes complete, no batteries or soldering needed.
Science Lab E37,854 $19.95

POTATO POWER—THE CLOCK IDEA OF THE YEAR

Two Potato Clock runs on potatoes, fruit, plants, soft drinks or even beer. Bi-metal probes convert natural ingredients to low voltage. Just connect wire to power source. Powers a 1/2" high LED clock. Overall measurements: 5-1/2" x 9" x 2-1/2".
Potato Clock E34,357 $19.95

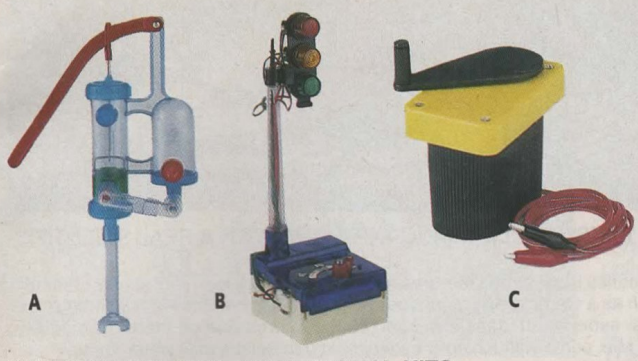


ALUMINUM-AIR BATTERY EXPERIMENT KIT

Learn basic principles of electrochemistry using power generated only from aluminum, air and salt water with this Fuel of the Future Science Kit. Easy-to-assemble kit contains instructions on how to make a 2-cell, 2-volt battery and conduct over 100 experiments. You only supply pliers, table salt and model cement. 96-piece kit contains components, activity book, more.
Battery Kit E38,466 $29.95

SPACE-AGE GYROSCOPE

Space-age design updates the classic gyroscope featuring a high-impact plastic body with brass and metal fittings. Precision-crafted to spin 3 to 5 gravity-defying minutes. Demonstrates principles of centrifugal force and gravity as used in ships, airplanes and space craft for stabilization and navigation. Complete with base, cord, 3-1/4" diameter gyro and instructions.
Gyroscope E38,647 $9.95



NEW "SCIENTIFICS" EDUCATIONAL KITS

• Easy-To-Assemble And Fun • Teach Science Principles

Our new Scientifics offer unique learning opportunities at a reasonable price. Each kit contains an experiment which teaches an important principle of science or engineering.

A) Pump: Build a working water pump. Learn the principles of suction and vacuum pressure. **E36,267 $13.95**

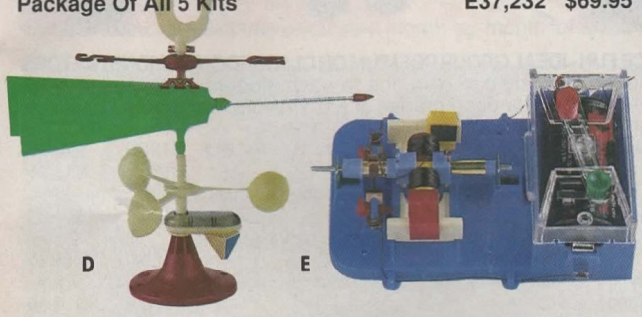
B) Signal: Build a traffic control signal light and learn the principles of electrical wiring and switching. **E36,274 $15.95**

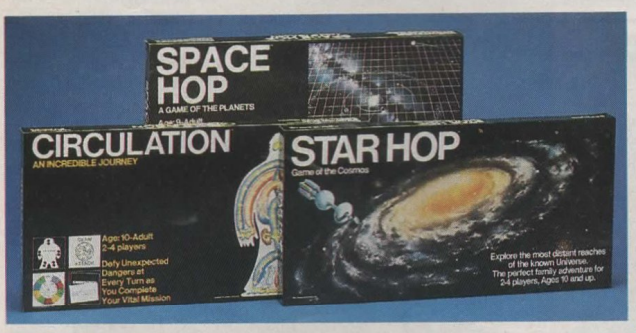
C) Generator: Build a hand-crank generator. Learn how electricity is created to light the mini-bulb. 5V-1A. **E36,270 $19.95**

D) Anemometer: A miniature wind direction and speed indicator. Teaches the principles of weather forecasting. **E36,268 $21.95**

E) Motor: Build a battery-operated mini-motor and learn how electromagnets drive the rotor. Requires a 1.5V "D" battery (not included). **E36,273 $12.95**

Package Of All 5 Kits **E37,232 $69.95**




SPACE HOP
A GAME OF THE PLANETS
CIRCULATION
AN INCREDIBLE JOURNEY
STAR HOP
Game of the Cosmos
Ages 10-Adult
2-4 players
Defy Unexpected Dangers at Every Turn as You Complete Your Vital Mission
Explore the most distant reaches of the known Universe. The perfect family adventure for 2-4 players, Ages 10 and up.

3 FUN GAMES TEACH SCIENCE FACTS & CONCEPTS

A) Circulation: A Journey Through the Body! Start with a plasma tray and move the blood stream. Pick up and drop off oxygen in the proper body area. When emergencies occur, go to the infected area and control the situation. Ages 10 and up. 2-4 Players. **E80,293 $23.95**

B) Space Hop: Race Through The Stars. Visit our Solar System, risk time warps, asteroids; learn about planets, comets. **E71,937 $21.95**

C) Star Hop: Where Space Hop leaves off. Explore the most distant reaches of the known universe. Ages 10 and up. **E39,143 $21.95**

THE VORTX™

• Demonstrates Tornado /Vortex Action

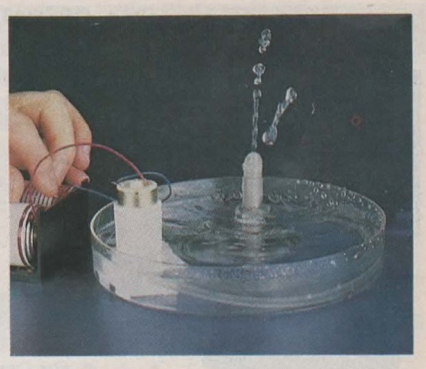
Drop a coin onto the launching pad, spin the Vortx™ unit in a circular motion. This creates an immense amount of speed causing the coin to spin around & around until it finally drops to the bottom storage area. "The longest continuous rolling so far is 33 hours, 16 minutes." Challenge your skills, spin the coin back up the tunnel or spin it upside down, plus more. Instructions include a simple explanation of how it works and leads the reader into a quest for more knowledge of physics and mathematics.

The Vortx™ E37,832 $17.95

MINIATURE SELF-PRIMING PUMP

For moving water displays or science fair experiments. Pumps up to 1 pint per minute with 12" high flow. Can use this handy pump in either direction. It is self-priming; uses 1-1/2 to 3 VDC. Operates on two "C" batteries (not included) and runs up to 48 hours before a battery change is needed. 4" tube included. Plastic and metal.

Mini Pump E50,345 $7.50
3-19 Pumps, $6.50 Each
20 or More, $5.50 Each



A) BRAIN/SKULL COMBINATION MODEL

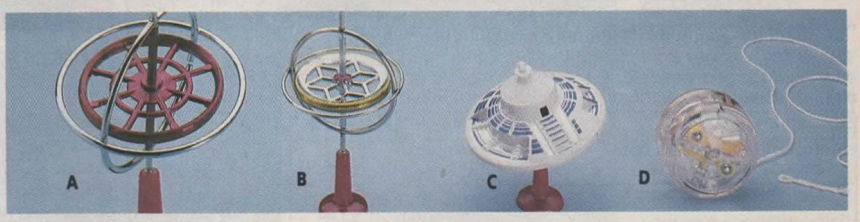
This finely detailed plastic kit can be used by doctors, educators, and schools for study purposes. A removable skull cap allows the brain to be displayed in or out of the skull. The teeth may be drilled and filled for demonstration. The skull is molded in bone white plastic and can be built with a movable jaw. The finished model is 10-1/2" tall and comes with anatomy chart and assembly instructions. Can be painted.

Brain/Skull E38,489 $28.95

B) GIANT AMERICAN BULL FROG MODEL

This finely detailed frog kit is over a foot long and contains a set of vital organs. Included are a snap-fit skeleton, instructions and a visual display showing the life cycle of a frog. Molded in green transparent plastic.

Bull Frog Model E38,488 $16.95



A) WHIRLING GIANT 5" HIGH GYROSCOPE

Gyroscope also illustrates the principles and phenomena which guide astronauts through space. Heavy duty steel flywheel with welded joints totters on a plastic base. 4-7/8" H x 3-7/8" diameter Includes instructions for gyroscope stunts: tightrope walking, satellite control, more.

E42,712 $9.50

B) CHANDLER 3-1/2" HIGH GYROSCOPE

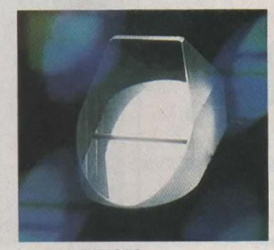
A classic educational toy for 75 years. Each one is cast, machined, painted and balance-fitted all by hand. Demonstrates "gyroscopic inertia" or rigidity in space as first recorded by Isaac Newton. **E37,265 $5.95**

C) SPACE GYRO

You can control the awesome power of Gravitron! Just feed the "power pull" through the generator slot and pull. Balance on the pedestal or your fingertip. Loop a kite string around Gravitron's tip and balance it horizontally. **E37,259 $6.50**

D) YO-YO WITH A BRAIN

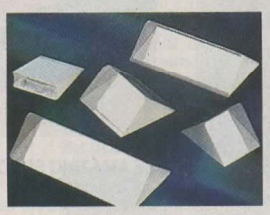
Patented "brain" in Yo-Yo spins and returns it automatically to user's hand. Precision engineered. Patented clutch mechanism allows it to spin faster and longer than any other Yo-Yo before returning to player's hand. **E36,213 $10.95**



7 x 50 PRISM

A piece of history and a unique rainbow maker. Originally made for World War II 7 x 50 military binoculars. These precision glass prisms will create a full spectrum rainbow from a ray of sunlight. Prism is 1" high x 2" long.

Prism E35,836 $7.75



PRISM DISCOVERY SET

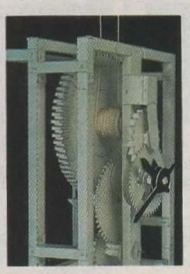
Set allows you to perform Newton's basic dispersion of white light into the spectrum experiments. Includes five acrylic shatterproof prisms. 1", 1.375", 1.5", 2.5" and 3" lengths. Ideal for hands-on classroom demonstration.

Prism Set E34,576 $14.95

EQUILATERAL PRISMS

Equilateral prisms have three equal 60° angles. Ideal for demonstrating how a beam of light breaks into the colors of the spectrum. All are made of optical glass. Face size is 25mm.

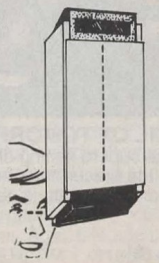
50mm Long	**E31,801**	**$5.35**
75mm Long	**E31,797**	**$5.75**
100mm Long	**E31,798**	**$6.85**
150mm Long	**E31,799**	**$9.25**



PAPER CLOCK BOOK

Cut up its 40 pages and fashion the pieces into an actual working wall clock, complete with a "tick tock" pendulum movement. You supply glue, three paper clips, nail, string. You can rewind and regulate clock. Keeps perfect time. 9-1/4" x 12-1/4" .

Clock E9687 $10.95

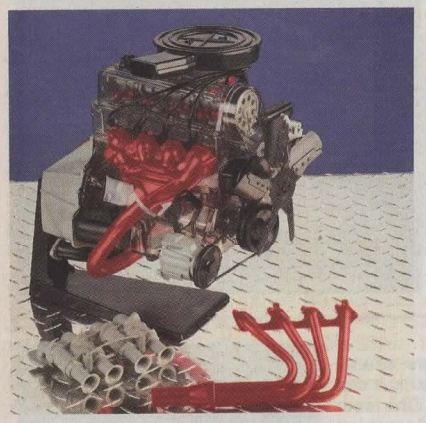


BUILD A PERISCOPE WITH THE OPTICS FOUND ON "PATTON" TANKS IN WWII

We supply the front and rear optics and instructions needed to build a quality periscope. You supply the material for housing. The optics are original U.S. Army Tank Corps issue. New condition. In original packaging. Valued originally at over $100.

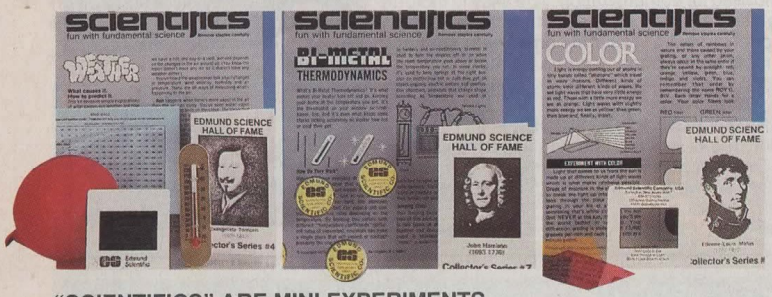
"Patton" Kit E35,993 $24.95

OPERATING SEE -THROUGH ENGINE MODEL KITS BY REVELL



A) Turbo Engine
(Pictured) 12 inches long molded in blue, red, and silver plastic. **Features:** See- through turbo charger with movable impellers. Real rubber fan belt and timing belt. Includes lights for "firing" spark plugs. Moving pistons and connecting rods. Operating distributor and moving crankshaft and camshaft. Optional high performance parts included. Instructions included. (Plastic glue is not Included). 10 years and older.
Turbo Engine **E38,910 $44.95**

B) V-8 ENGINE
(Not Pictured)
Build a working V-8 demonstrator engine. 1/4 scale model. Crank shaft rotates. Spark plugs light up. Valves open and close. Rods and pistons move. Takes two "C" batteries (not included). Engine rests on stand. Requires model glue for assembly.
V-8 Engine **E70,448 $44.95**



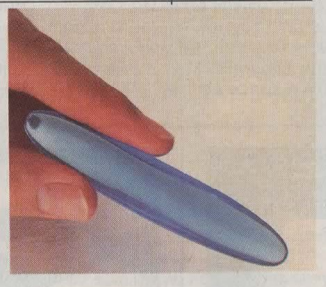
"SCIENTIFICS" ARE MINI EXPERIMENTS

"Scientifics" explore eight different science areas. Kits include background material on the topic to be explored, the materials needed to carry out those explorations, suggested experiments. Introduce scientific principles and to stimulate young minds.

		INDIVIDUAL PACK	PACK OF 12
Magnets: Watch magnets float in space or build a compass.	E1001	$3.99	E12,101 $43.50
Prism: Precision glass prism breaks sunlight into a rainbow of color.	E1002	$3.99	E12,102 $43.50
Mirrors: Build your own kaleidoscope	E1003	$3.29	E12,103 $35.50
Weather: A miniature weather forecast stationin a kit.	E1004	$5.29	E12,104 $56.95
Illusions: Optical illusions trick the mind and eye.	E1005	$3.79	E12,105 $40.95
Color: Assorted filters show how primary colors build a rainbow.	E1006	$3.99	E12,106 $43.50
Bi-Metal Discs: Our thermal jumping discs.	E1007	$3.79	E12,107 $40.95
Science Oddities: Rainbow grating, winking eye, jumping disc.	E1008	$3.79	E12,108 $40.95

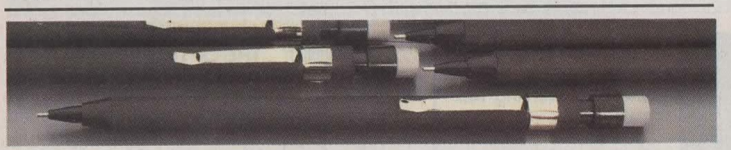
CRITTER CARNIVAL

• Bugs Under The Big Top
Enjoy the science of entomology, watching your bugs perform in this unique and fanciful Bug House. 7 bug amusements just like obstacles found in nature, plus a bug watering hole. Five magnifying lenses are built into the dome for better viewing. The top magnifier is removable for easy feeding or easy access to your bugs. Included are: tweezers, a miniature net and a scoop for capturing real bugs.
Bug Tent **E38,892** **$12.95**



THE AMAZING SPACE PET OR "CELT"

Originally called "celts" because their curious properties were first discovered by archaeologists studying prehistoric axes and adzes called celts. *These rocks, had a preferred direction of rotation* . Spin the space pet *the other way* and it will stop, rock up and down on the long axis, and then reverse its spin. Hint: the round edge is an ellipsoid, with its axis aligned at an angle of about five to ten degrees from the main axis of the stone. Angular momentum is conserved, but it doesn't look it. Made of injection molded acrylic . Size: 3-7/8" x 3/4" x 1/2".
Space Pets Pkg. of 3 **E38,912** **$5.95**



THE MECHANICAL PENCIL OF TOMORROW

Sleek .5mm thin lead pencil has superb writing characteristics. Soft rubber body is easy to hold. A simple push on the eraser head advances the lead. Made to sell for 79 Cents each. Our price, in four dozen lots, is about 46 cents each.
Four Dozen Pencils **E34,074** **$22.95**
One Dozen Pencils **E35,730** **$7.50**
Extra Leads (48) and Erasers (8) **E34,088** **$4.25**

"SCIENTIFICS PLUS" ARE LEARNING ACTIVITIES WITH A REAL SCIENTIFIC INSTRUMENT

Edmund's "Scientifics Plus" series features activity kits based upon well known scientific instruments such as a stethoscope or microscope. Each kit contains such an instrument plus instructions, experiment ideas and background information on the topic of study.
1. Water Pump: Mini pump with tubing & battery holder,to build a mini water fountain. **E1032 $9.95**
2. Pocket Microscope: Professional quality 25X or 50X microscope with precision glass optics, clear plastic focusing cell. **A. (25X) E1033 $12.95** **B. (50X) E1244 $13.95**
3. Stethoscope: A "nurses" model stethoscope to hear a heart beat. **E1230 $12.95**
4. Solar Electricity: Mini solar panel & motor to build a solar powered engine. **E1231 $11.95**

BAGS OF SCIENCE FUN - IDEAL GROUP PREMIUM OR CLASSROOM DEMONSTRATORS

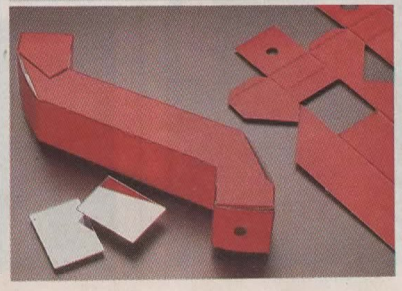
Inexpensive enough that you can give one to each student or group member. Unique incentive premium for good grades or party favors. Bags of Science Fun are packed in small cloth sacks with drawstring closure.
Compass: 20 nickel-size metal and plastic compasses 7/10" dia., 1/4" thick. **E1306 $13.95**
Lens: 25 simple magnifier lenses. **E1305 $13.95**
Magnets: Sack of 50 magnets of assorted sizes, shapes and pull capabilities. Includes 3 stacking poles and base. **E1303 $12.95**
Motors: 20 mini 1.5volt battery powered motors, with shaft & wire leads. **E1304 $14.50**
Rainbow Viewers: 15 (2" X 2") diffraction grating squares on cardboard mounts. Break white light into rainbow spectrum. **E1307 $14.50**

THOUGHT PROVOKERS ARE INEXPENSIVE CLASSROOM/GROUP CURIOSITY STIMULATORS

Thought Provokers are inexpensive mini-experiments featuring a simple scientific device/material. They are ideal stimulators to attract and challenge a child's curiosity. Each kit is individually packed in a mini polybag with a booklet of experiments and games appropriate to the material supplied. **50 Piece Discounts Available for teachers and scout groups.**
Pack of Six kits per stock number.
Motor: Battery powered 1.5 volt mini-motor with shaft and wire leads **E1226 $5.25**
Optics: Simple magnifier lens with experimental ideas. **E1227 $5.25**
Magnets: Magnets of assorted sizes and shapes. **E1228 $5.25**
Jumping Disc: Three discs: quarter head and tail plus one ES logo. **E1229 $5.95**

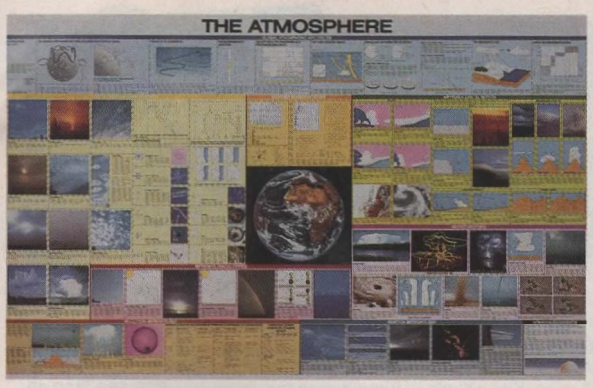
REFRACTOR TELESCOPE KIT

With this kit, even an eight-year-old can build an 8X refractor telescope in less than an hour. Includes objective lens, eye lens, glare stops, kraftboard tubes and instructions to make an 18" long telescope. Finished product is powerful enough to show craters on the moon, Jupiter's moons and many stars, not visible to the naked eye. Boxed.
Telescope Kit **E71,473** **$19.95**
Group of 10 Telescope Kits
Special pricing for large groups. Ideal for astronomy group projects. **E71,474 $189.95**

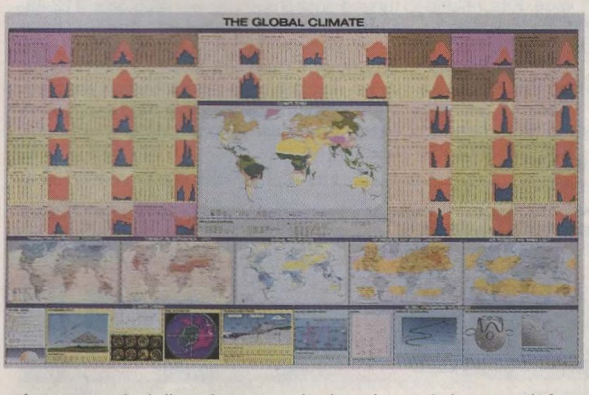


PERISCOPE KIT

Children of all ages can build their own periscope and scan the horizons without being seen themselves. Contains die-cut fiberboard body, two optical quality mirrors and instructions. Can be assembled in about 25 minutes using tape and glue. Finished periscope is 14-1/2" x 3/4" x 2-3/4". Red.
Periscope Kit **E31,788** **$12.95**
Group of 10 Periscope Kits **E37,825** **$104.95**

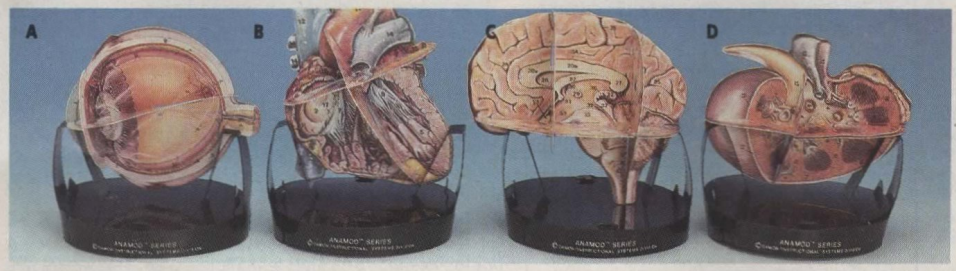


A. GIANT 55" x 33" ATMOSPHERE WALL CHART
• Guide To World Weather
The complete guide to Earth's atmosphere, produced in consultation with the American Meteorological Society, contains dramatic photographs, vivid illustrations and informative text. Large, glossy wall chart covers: global atmospheric influences, meteorological motion, clouds and precipitation, severe weather, meteorological optics and pollution meteorology.
E38,789 $34.95



B."The Atmosphere"Overhead Transparency Teaching Manual. (Not shown). Compiled from the above chart, set contains 20 - 8-1/2" W x 11"L transparencies covering the key topics listed on atmosphere,weather and meteorology. **E38,790 $130.00**

C. GIANT 55" x 33" GLOBAL CLIMATE CHART
A complete guide to the world's climate zones. Explains climate changes such as the Greenhouse Effect, Ozone Layer depletion, Global Climate System, Solar Radiation Budget, Albedos, and more. Divides the globe into 42 geographical climate sections by latitude and longitude. Each chart gives the mean temp. (min. & max.), relative humidity (%), precipitation (mm), rain days, sunshine (hrs.) and most frequent wind direction, as calculated month-by-month for a year. **Giant Chart E38,791 $34.95**



ANAMODS — ANATOMY MODELS **• 9 Models To Choose From**
Detailed, multi-sectional, full color reproductions of nine body organs and systems for an economical illustrated biology study guide. Fabricated of heavy laminated vinyl, washable and almost indestructible. Easily snap together or can be folded flat for easy storage. Each approximately 8"H with stand. Also included: complete anatomy discussion and activity lessons on the selected Anamod.

Anamods $9.95 Each		*Three or More, $9.50 Each*	
Brain (C, above)	E38,870	Liver	E38,874
Eye (A, above)	E38,871	Kidney (D, above)	E38,873
Heart (B, above)	E38,872	Lung	E38,875
Ear	E38,876	Male Reproductive System	E38,878
Female Reproductive System	E38,877		

DISCOVER THE WORLD — THROUGH SIX FUN GAMES
• Geography Skills Made Easy
Discover continents and oceans, the Earth's tectonic ridges, boundaries and zones through learning game activities.

A. Spilhaus GeoGlyph. Move the puzzle pieces to discover the many possible views of Earth. Shows the continuous surface of our planet, making a mosaic of over a hundred correct maps. High-quality plastic,12" x 22". Instructions incl. Ages 8 and up. **E38,885 $26.95**

B. GeOdyssey - The World Game. Players compete to build a world map—tile by tile. Tiles fit together in many possible configurations, but not all are geographically correct. Test your knowledge by identifying continents, coastlines, etc. 32 tiles, 3 colors; 2 - 4 players.
GeOdyssey E38,886 $16.95

C. GeOdyssey Deluxe. Played the same as above, but tiles are larger and continents and oceans are labeled, making it easier. 72 tiles, 9 colors; 2 - 6 players.
E38,887 $26.95

D. Flight Lines. Follow flight routes of major airlines around the world using Geo-Triangles. Opposite sides of the cards show the antipole, so if you always thought China was opposite North America, guess again! Travel game has 10 pieces; only one player needed.
Flight Lines E38,888 $6.75

E. TectoniCube. Seven-sided geometric form shows how the Earth's tectonic plates fit together. Displaying various ridges, boundaries, zones and faults, model illustrates how earthquakes and other geophysical events are caused.
TectoniCube E38,889 $4.95

F. GeoCards. Put together a map of the world with this deck of 48 cards, each representing a different geographical location. This game can be played to hundreds of possible configurations, each one an absolutely correct map of the Earth — or is it? 1 - 6 players. **E38,890 $8.95**

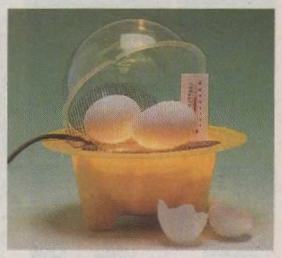
BUTTERFLY GARDEN
Watch nature at work as live caterpillars develop into beautiful butterflies. Kit includes colorful flight cage for butterflies, feeding kit, care instructions, fact sheet and a coupon to send for your culture of five caterpillars.
E38,465 $22.95

INSTANT LIVE TROPICAL FISH
Witness the hatching of live tropical fish in less than two hours. Our new aquaculture kit provides everything you need to explore this exciting science: Aquaculture mini tank, test tubes, eye dropper, instructions, fish eggs and Brine Shrimp eggs (hatch to feed fish) coupon. Ideal home or classroom project with great learning potential in aquaculture and biotechnology.

Instant Fish E38,648 $19.95

MINIATURE ECO-CAPSULE
A balanced, closed system of three Eco-zones — air, sea and land. Weather systems develop in the air zone (condensation - rain) and waste settles to the land zone and is changed to nutrients (produces its own oxygen, carbon dioxide and nutrients). Live artemia that you hatch from eggs in a separate hatching vial are then added to the Eco-capsule, completing the biological balance of your mini planet. A true prototype for future space colonies.
Eco-capsule E38,792 $29.95

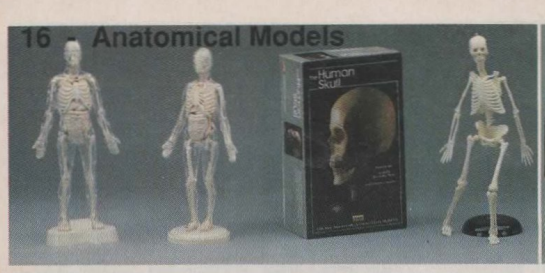
INCUBATOR/ BROODER
See the miracle of birth in your own classroom. Watch eggs grow and hatch into chicks. Incubator measures 7" Dia. x 6"H; operates on 110 volts. Clear viewing dome; thermometer for checking temperature. Light bulb to produce heat for hatching. Aluminum heat reflector and wire egg rack. Eggs not included. Holds approximately 4 quail eggs, 3 chicken eggs or 2 turkey or duck eggs. (Call local poultry dealer for fertilized eggs).



Incubator E38,724 $14.50

BUILD & ERUPT VOLCANO KIT
Every child's dream come true! This safe and educational kit was developed by an elementary school science teacher. Just add household baking soda and vinegar (not incl.) for simulated lava flows. Kit includes: bag of instant papier mache mix, plastic vial, working tray, educational activity pamphlet & directions to erupt volcano. Great learning fun!
Volcano Kit E38,775 $11.95

FLOWER PRESS KIT
Preserve the beauty of flowers and leaves. Easy-to-make note cards and pictures, plus instructions for many creative and inexpensive projects. Includes 7" x 7" heavy duty wooden flower press. 12 personal notes and matching envelopes, mounting paper and a 6" x 8" matt frame. Ages 8 to adult.
E38,774 $18.95



ANATOMY KITS

• Ready To Paint And Assemble

Each is made of high-impact plastic and comes with complete instructions. (Sorry, cements and paints not included).

A and B) Visible Man And Woman. Easy-to-assemble scale plastic model kits display the inner workings of various body cells, organs and muscles of the male and female species. Male model stands 16" tall, female stands 15-1/2" tall and also includes parts to demonstrate a 7-month pregnancy. With stands.

Visible Man E70,228 $18.95
Visible Woman E70,283 $18.95

C) Human Skull. Life-size, anatomically-correct plastic model kit. Molded bone white plastic. Black stand. Movable jaw, teeth can be drilled and filled. Stands 10-1/2" tall, 5" wide when finished. With anatomy chart and instructions.

Human Skull Kit E35,834 $16.45

D) Human Skeleton. Snap-fit, requires no gluing. Stands 16" tall. Joints flex into various positions. Bone white plastic. With display stand.

Human Skeleton E38,056 $11.45

Plastic Laboratory Kits. Ideal for demonstration and science fair projects. Each approximately 8" high x 6" wide. Kits include instructions, detailed parts, display stands.

E) Human Lung. Includes color poster . E36,194 $12.45

F) Human Tooth. Model is hinged to show interior. E36,195 $12.45

G) Nose/Mouth. Study of glands, nerves, cartilage. E36,566 $12.45

H) Human Heart. Life-size, hinged model for study of inner chambers. E36,567 $12.45

J) Human Ear. Outer, middle and inner ear - canals, drum, nerves. E36,568 $12.45

K) Human Eye. Four times human size with hinged sections. E36,569 $12.45

L) Brain/Skull. Half-skull with brain sections removable for study. E36,570 $12.45

M) Glow-In-The-Dark Skull. Molded in bone white, no painting required. Anatomically-accurate, featuring removable skull cap, spring action lower jaw and complete set of adult teeth. E71,539 $12.45

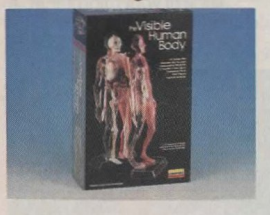
THE PUMPING HEART

Life-size, anatomically-correct kit details the workings of the human heart. Squeeze the ball pump and "blood" circulates through the heart. Model stands 11-1/8" high. Lifelike continuous action pump. The heart chambers are clear plastic. White display frame and stand. Easy to assemble kit includes information sheet and coloring instructions.

Pumping Heart E35,825 $14.95

PAPER HUMAN SKELETON

Bare Bones: Everybody's Inside Out, by David Hawcock, is a new way for children to learn all about the make-up of the human skeleton. Only 20 pieces to cut and glue together. When completed, an adult female skeleton will be 2/3 life size or one meter tall. Fully posable universal movement and extension/flexion. Complete step-by-step instructions. Only scissors and glue are necessary. E37,500 $14.95



VISIBLE HUMAN BODY KIT

3-dimensional, anatomically accurate unassembled model is 1/6 human size. Transparent body shows skeleton & vital organs. Pieces fit together and can be taken apart. Includes anatomy chart & assembly instructions. Used by doctors, students and educators.

Human Body E38,731 $16.95

CRITTER CATCHER

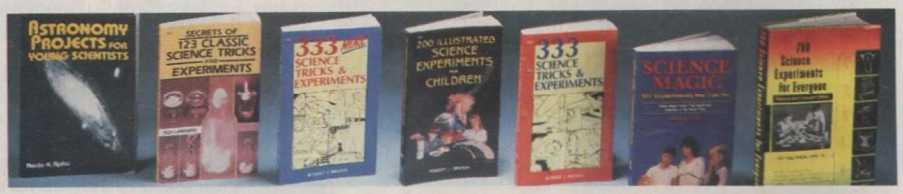
This adventure kit will provide hours of fun. For five years and up. Kit includes flexible butterfly net with a 28" net sock, 3X/6X magnifier with break-resistant lenses and a shatterproof bug bottle with vent holes and belt clip. Explore & discover nature.

Catcher E37,867 $14.95

OPTIC WONDER

Seven optical tools are combined into one 3-1/4" long instrument. Includes a 2X magnifying glass, compass, linen tester, binocular, signal mirror, monocular and stereoscope.

Optic Wonder E36,003 $5.25


Astronomy Projects for Young Scientists
Secrets of 123 Classic Science Tricks
Experiments
333 More Science Tricks & Experiments
200 Illustrated Science Experiments for Children
333 Science Tricks & Experiments
Science Magic
700 Science Experiments for Everyone

SCIENCE FAIR BOOKS/GUIDES—FOLLOW THE SCIENTIFIC METHOD

A) 700 Science Experiments For Everyone— 251 pgs. Compiled by science instructors under the auspices of UNESCO in Paris, this latest edition features Optical Projection, Electricity, Chemistry, Astronomy, Magnetism, Geology, Physiology & more.

700 Experiments (Hardback) E9301 $13.95

B) 333 Science Tricks And Experiments— by Robert J. Brown. 208 pages. Targeted to elementary and high school students. Paperback. Demonstrate Hydrotropism, Dopplers effect, make a light engine or a reflection underwater. A treasure trove of scientific "examples" for elementary education use. Using inexpensive readily available materials. Each experiment fully explained.

333 Science Tricks E9703 $9.95
333 More Science Tricks E35,838 $10.95

C) 123 Classic Science Tricks And Experiments— by Edi Lanners. Ever see a hovering ladle? Would you believe a dancing egg? This facinating book reveals the secrets and scientific principles behind these and over 100 mind-teasing "Scientific" magical tricks and experiments. 191 pages.

123 Science Tricks E4192 $7.95

D) Science Magic— Mystify and entertain audiences while learning basic scientific principles. 101 simple, fully explained tricks. Covers magnetism, chemistry, numbers and physics. Build an Aeolian Harp or be a human calculator.

Science Magic E9672 $9.95

E) Astronomy Projects For Young Scientists— by Necia H. Apfel. Build a simple telescope, spectroscope and planetarium.and more. 118 pages. Learn how to design a project, where to obtain information, to find supplies, and how to enter your project in science fairs. **Astronomy Projects** E9699 $9.95

SKELETAL HAND AND FOOT

Complete in every detail. Life size, fully-articulated, anatomically correct. These models provide the opportunity to study the workings of the hand and foot close up with charted explanations and a mounting pedestal that names all the parts of the foot.

Skeletal Hand E39,209 $10.95
Skeletal Foot E39,210 $10.95

HANDS-ON EDUCATOR ADVENTURE SCIENCE KITS

Each kit includes sorting tray, magnifying glass, activity cards and instructional guide and charts.

A) Fossils Discovery Box. Kit includes 14 large authentic fossils Dinosaur bone, sharks tooth. E37,869 $19.95

B) Rock Discovery Kit. Kit includes 2 large rock & mineral specimens (6 minerals, 6 sedimentary rocks, 5 igneous rocks & 3 metamorphic rocks). E37,870 $19.95

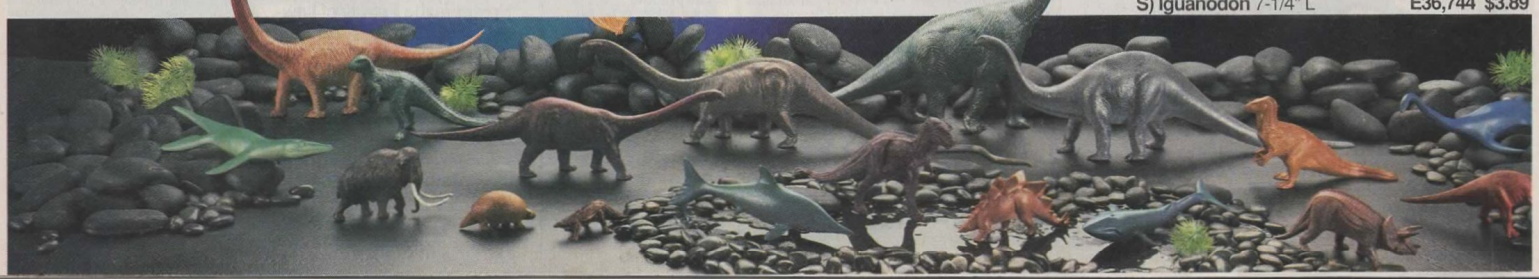
C) Sea Life Discovery Box. This kit includes a generous assortment of 25 large shells, starfish, coral and other sea life specimens. Full color sea life ID photo. Plus a sturdy storage box.

Sea Life Kit E37,871 $19.95

BRITISH MUSEUM DINOSAUR REPLICAS

These beautiful models were sculptured by the craftsmen of the British Museum *(Natural History),* London, in solid, unbreakable, self-colored modern plastics material. The shape, size and skin textures of these creatures are as imagined by the British Museum experts from fossil remains and other prehistoric evidence. **Super Saver Price on All 19 Models E38,897 $78.50**

A) Megalosaurus 8" L E36,741 $3.79
B) Scelidosaurus 3-3/4" L E36,736 $2.19
C) Glyptodon 3" L E36,737 $2.19
D) Pteranodon 6-1/2" W E36,738 $2.19
E) Stegosaurus 5-3/4" L E36,739 $3.19
F) Triceratops 4-7/8" L E36,740 $3.79
G) Pliosaur 8-1/2" L E38,741 $2.59
H) Mamenchisaurus 12-1/2"Lx10"H E38,740 $5.99
I) Brontosaurus 17" L E38,739 $7.59
J) Ichthyosaurus & Stand 8-1/4" L E38,711 $4.39
K) Brachiosaurus 17" Lx12" H E36,749 $17.99
L) Diplodocus 19-1/2" L E36,748 $8.59
M) Cetiosaurus 13" L E36,747 $6.29
N) Muttaburrasaurus E38,742 $2.59
O) Tyrannosaurus 10" L E36,745 $4.89
P) Woolly Mammoth 4-1/2"L E36,743 $4.29
Q) Plesiosaurus 10-1/4"L E36,746 $5.49
R) Blue Whale 7-7/8" L E36,742 $3.99
S) Iguanodon 7-1/4" L E36,744 $3.89



A) COMPLETE ROCK POLISHING KIT

Everything that is needed to begin enjoying this unique and interesting hobby is included, even the rocks. Polishing tumbler has 115V motor and three pound barrel. Also includes jewelry findings and detailed manual. Create fascinating gifts and more.

Rock Polishing Kit (Single Barrel, pictured) **E80,276 $79.95**

Rock Polishing Kit (Double Barrel). 6 lb. capacity; includes grit pkg. Not shown. **E39,063 $94.95**

Replacement Abrasives **E70,867 $11.95**

B) MINERALS AND FOSSILS

Authentic specimens packaged for display and study.

100 Rock And Mineral Specimen Set. Includes 36 rocks from igneous, sedimentary and metamorphic groups and 64 minerals, including samples of elements, sulfides, halides, oxides-hydrixudes, sulfates, tungstates, silicates, carbonates, phosphates, sorosilicates, cyclosilicates, inosilicates, phylloscilicates, tectosilicates, feldspar group and scapolite group. Specimens are mounted on cardboard display tray. Includes 15 page study guide which details rock and mineral groups, provides a listing of specific gravity and hardness for minerals and more. **E71,176 $42.95**

35 Rock And Mineral Specimen Set. Includes rock and mineral samples and study guide described above. **E40,329 $13.95**

Fluorescent Mineral Set. 15 specimen set of fluorescent minerals from across the United States and Canada. **E71,802 $24.95**

Fossils. 15 piece collection of specimens ranging from 10 to 500 million years in age. Mounted in display/study tray. **E35,837 $19.95**

C) ROLLING STONES® ELECTRIC ROCK TUMBLER - SINGLE BARREL

Change rough rocks into beautifully polished gemstones. Make exciting jewelry. New, improved model conforms to all government regulations. Includes: U.L. listed tumbling machine with heavy duty motor, rough semi-precious stones such as Amethyst, Jasper, Agate and others. Grits and polish, jewelry settings, glue and instruction manual. Ages 10 and up. **E37,875 $34.95**

D) DOUBLE BARREL ROCK TUMBLER

(not shown). **E38,905 $54.95**

BUG BOXES

Acrylic Plastic boxes have built-in magnifier covers for studying insects and specimens. Packed in bags of 25 and 100. Two sizes. 1" square box has 4X cover. 1-1/2" square box has 3X cover.

Quantity	1" Square	1-1/2" Square
25	E35,048 / $12.95	E35,049 / $24.95
100	E36,145 / $46.00	E36,146 / $91.00

A) A SOCIETY OF ANTS ALL WORKING ON THE FARM

Watch hard working ant engineers build rooms and tunnels. Watch them sow, reap, harvest and store food. This all-time favorite ant farm kit includes an unbreakable 10"x15" plastic see-through case, green frame and stand, sand and certificate for live shipment of ants (takes about two weeks for shipment to arrive via mail. Ants cannot be shipped to Hawaii or Tennessee).

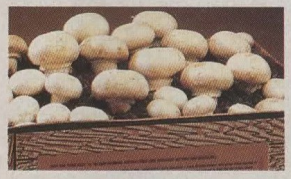
Giant Ant Farm **E70,295 $18.95**

B) SMALL COLONY ANT FARM

Measures 8-1/2" x 6". **E37,874 $ $12.95**

C) ANT CITY

Six 4-3/4" x 4-1/2" ant modules that you can interconnect with vinyl tubing. Watch as nature's smallest engineers dig tunnels and build bridges. Unbreakable, escape-proof construction designed by one of the world's foremost entomologists. Kit includes 6 modules, tubing, eyedropper, tweezer, special sand, ant food, instructions and a certificate for a supply of ants. **E37,873 $22.95**



MUSHROOM FARM

Grow a bumper crop of delicious mushrooms at home. Add water and watch them grow right in the box. Includes mushroom spawn and starter materials. First crop is ready in 30 days. Grows several crops over a three month period. 15" x 10-1/2" x 7-1/4".

Mushrooms E71,899 $13.95

FROG HATCHERY KITS

A) Watch a tadpole change into a baby frog you raise. See-thru, glass-like skin lets you see inside frog's body. Playful pet lives in water; needs no land at all. Kit includes plexaquarium, underwater landscape, growth food, handbook and Grow-A-Frog coupon. Tadpole is delivered via First Class mail. **E35,812 $14.95**

B) Observe the tiny embryos hatching into wiggling little tadpoles which will eventually develop into pet frogs. Each kit includes flexible plastic aquarium, illuminated magnifier that operates on 2 "AA" batteries (not incl.), booklet of instructions, tadpole food, and a coupon for 6-10 early-stage live frog embryos. **E37,872 $19.95**

GROW YOUR OWN CRYSTALS

Just dissolve the pre-mixed chemicals in water. Crystals appear in a few hours. The mini crystal sets make crystals up to 4"in diameter. The medium kit up to 6". Step-by-step instructions included with each kit.

	Small 4"Kit	Medium 6" Kit
	$11.50 Each	$16.50 Each
Quartz-Like	E35,827	E37,876
Clear Spike	E35,828	E37,877
Green Spike	E35,829	E37,878
Red	E35,830	E37,879
Amethyst	E35,831	E37,880

One of each 4" Kit **E35,832 $49.95**
Clear W/ Purple (Special) **E37,881 $16.50**
Medium Crystal Kit—4 colors. **E34,365 $32.95**

MAGIC CRYSTAL GARDEN

Just mix the crystal solution with water and pour over the paper garden. Flowers bloom, trees bud and snow appears on the mountain. **E37,886 $7.50**

"LITTLE CHIRPER" CRICKET CAGE

Crickets have been kept as household pets in the Orient for centuries. With our Little Chirper Cricket Cage, they are easy to care for. Sturdy wood and metal screen design makes the perfect home. Vinyl door. 3" x 3" x 5", includes carpeting, food and water dishes, cricket food and a fact-filled booklet.

Cricket Cage E37,514 $10.95

NATURE LAB

Over 50 experiments and activities. Includes Observation Lab, real dinosaur bone, fossils, rocks, minerals, seashells, seeds, planting soil, dioramas, magnifying glass, insect viewer, full-color 32-page activity book.

Nature Lab E37,895 $39.95

CRITTER CONDO

An ant theater, a butterfly hatchery, a terrarium, an aquarium or a home for other animals! Includes specially designed base and dome, inner shell, perlite sand, ant food, pipette and a 32-page booklet

Critter Condo E37,894 $19.95

BUG HOUSE

Screened container was specially designed to let bugs live. Educational and safe for bug-watchers to use. Durable quality. Measures 5" tall x 3" diameter.

Bug House E38,436 $4.95

MAGIC ROCKS - CREATE AN UNDERWATER GARDEN

This kit includes a 4-1/2" high clear plastic container with see-through lid. Magic growing rocks and solution. Rocks reach 3 to 4" in height in just 1 hour. Rainbow color display.

Magic Rocks E31,323 $9.95

COSMIC COAL

Do you ever wonder how it all began? Go back to the dawn of time. Grow colorful formations, using nature's building blocks for our own planet, from coal, in just minutes. Kit contains 1 packet of cosmic coal, tray, ocean-blue liquid, ammonia, cosmic dust, vials of coloring and a lightning rod.

Cosmic Coal E37,891 $11.95

FANTASY CRYSTALS

Fantasy Amethyst. 3.5 oz. jar of potassium aluminum sulphate with 3% potassium chromium sulphate. Will grow a purple crystal. **E37,888 $8.50**

Fantasy Diamond. 3.5 oz. jar of potassium aluminum sulphate, will grow a white (clear) crystal. **E37,887 $8.50**

MAGIC® TREE

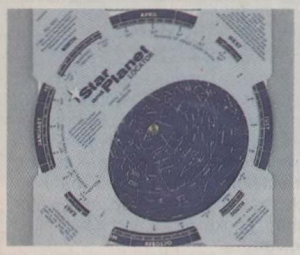
2" miniature completely artificial tree that buds in 15 minutes. Assemble tree, mix crystal solution with water, dip tree in liquid and watch it grow. Pkg. of 4 trees.

Magic® Tree E37,475 $6.50

PERFUME MAKING KIT

Standard distillation condenser captures favorite garden fragrances—roses, pine, etc. Easy 5-step distilling process is the "key". Detailed instructions show how to capture essential oils in useable form to make perfume, cologne, after shave, etc. 11" high. You supply raw material, lard and undenatured ethyl alcohol.

Perfume Kit E71,684 $29.95

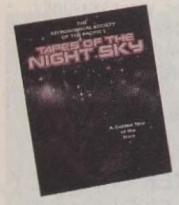


EDMUND'S FAMOUS STAR & PLANET LOCATOR

- **Pinpoints Sky Position Of Over 500 Stars And 9 Planets**
- **Adjusts To The Precise Hour, Day, Month And Year**
- **Popular Teaching Aid**

Our famous rotating roadmap of the heavens shows the location of the stars, constellations and planets relative to the horizon for the exact hour and date you determine. Our 8-1/2" square star chart was plotted by famous astronomer and chartographer George Lovi. The reverse side of the locator is packed with additional data on the planets, meteor showers and bright stars. Included with each star chart is a 16-page, fully-illustrated pocket size instruction booklet.

Star & Planet Locator	**E9227**	**$2.75**
Bargain Pack of 25	**E70,156**	**$32.95**
Four or More Packs of 25,	**$29.95 Each Pack**	



TAPES OF THE NIGHT SKY

- **A Guided Tour Of The Stars**

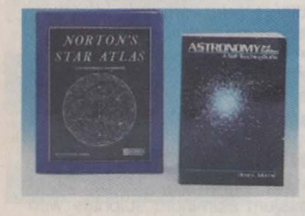
Two cassettes contain four half-hour tours, one for each season of the year. Features basic instructions and information about astronomy and mythology. A 60-page booklet contains the complete script of the tapes with illustrations, specially-designed star maps for each season, and a beginner's reading list.

Night Sky Tapes **E38,626 $17.95**

DISCOVER THE COSMOS

"Night Watch" identifies stars, planets, constellations and nebulas simply and without complicated math formulas. Written by noted astronomy professor and former Astronomy magazine editor Terence Dickinson. Includes discussions on eclipses, probing beyond the stars .

Nightwatch **E9673 $24.95**



ASTRONOMY—A SELF TEACHING GUIDE

- **Author, Dinah L. Moche**
- **3rd Edition**

A self-teaching guide to the stars, planets, and galaxies, this completely updated edition features new data gathered during the recent visit of Halley's Comet and from the Voyager fly-bys of Saturn and Uranus. Includes four removable star charts, new illustrations and photographs. Astronomy includes self tests, questions, exercises, useful references and simple experiments. 288 pages.

Astronomy Self-Teaching Guide (Paperback) **E9789 $14.95**

NORTON'S 2000.0 STAR ATLAS AND REFERENCE HANDBOOK—18TH EDITION • Edited by Ian Ridpath

This unique reference work has been an indispensable guide for amateur and professional astronomers. The maps in the Atlas show the position of over 8,400 stars and 600 nebulae, and their arrangement allows an area of about one-fifth of the entire heavens to be seen at a single opening. Detailed maps of the moon and of Mars.148Pgs.

Norton's Star Atlas (Hard Cover) **E9464 $39.95**

HOME PLANETARIUM

Stencil kit lets you sleep under 350 stars.All with accurate positions and brightness. Takes 1 to 3 hours. Stars are not visible under normal light.

8 Ft. Winter Sky **E37,882 $26.95**
8 Ft. Summer Sky **E37,883 $26.95**
12 Ft. Winter Sky **E37,884 $42.95**
12 Ft. Summer Sky **E37,885 $42.95**

EDMUND SCIENTIFIC'S PASSPORT TO THE STARS

• Learn Astronomy In Your Home In 8 Easy Lessons • Maps • Charts • Books

Passport To The Stars is fun, easy and fascinating. It's Edmund Scientific's step-by-step program in observational astronomy. Designed for the beginning amateur astronomer, **Passport To The Stars** was written by a team of astronomers headed by Terence Dickinson, renowned astronomy communicator. With **Passport To The Stars** you start at the very beginning, with identification of the Big Dipper and the North Star (Polaris). From there you progressively develop the skills to locate and track all of the major sky markers. By the end of Phase VIII, you will be fully acquainted with all major aspects of astronomy, and even have acquired the basic skills necessary to take beautiful astrophotographs!

Your 8-Phase guide to the basics of astronomy will cover the following topics:

Phase I. Astronomy From Your Backyard
Phase II. Stars and Constellations
Phase III. Telescopes for Amateur Astronomy
Phase IV. Sun, Moon and Eclipses
Phase V. Planets, Comets and Meteors
Phase VI. Probing Beyond the Solar System (Part 1)
Phase VII. Probing Beyond (Part 2)
Phase VIII. Photographing the Sky Show

Passport To The Stars is designed so you can participate with or without the aid of optical equipment. And that's not all! You will also receive many special bonuses to help you on your journey, observational guides and your own Certificate of Completion. Your eight lessons are sent to you in a vinyl binder with sky log to record your sightings and progress. Experience the excitement of the outer limits!

Passport To The Stars **E9600 $54.95**

***Passport To The Stars** has been endorsed by **Isaac Asimov,** scientist and author of over 200 books! "If I were beginning the study of astronomy today, I couldn't think of a better pathway than Passport To The Stars. I envy you the fun you have in store."*

OUR MOST POPULAR BOOKS AND ATLASES

A) Mag 6 Star Atlas. A practical sky guide covering all aspects of amateur astronomy, specially designed for both indoor and outdoor use. This comprehensive spiral workbook contains detailed data on more than 1,000 celestial objects including multiple stars, variable stars, nebulas and galaxies. Superbly detailed star charts accurately identify all stars to magnitude 6.2 and hundreds of fainter objects. Richly illustrated with dozens of photos, diagrams & tables. 50 pages.

Mag 6 Star Atlas **E9611 $17.95**

B) Edmund's Famous Best Seller "All About Telescopes." Sometimes called "the amateur astronomer's bible" , our classic 190-page book is a highly illustrated and easy-to-understand guide. Contents include: *Getting Acquainted with the Telescope; Observing the Sky Show; Photography with your Telescope; Mirror Grinding and Testing; Telescopes you can Build; Telescope Mounts; Collimation and Adjustments; Telescope Optics.* The author, Sam Brown, includes all the basic information an amateur needs to be a real professional.

All About Telescopes **E9094 $13.95**

C) The Edmund Mag 5 Star Atlas. Lists all stars to magnitude 5.0 down to 60° south declination. Chart scale is 1/8" per degree—perfect for measuring eyepiece field with an ordinary ruler. Includes lists of celestial objects, constellation index, Moon map, sinusoidal projection maps and star lists. Recommended for both the amateur and experienced astronomer. 35 pages. Paperbound. **E9118 $7.50**

D) The Edmund Sky Guide. Terry Dickinson and Sam Brown's step-by-step procedure for discovering the night sky with the unaided eye, telescope or camera. 35 pages of simplified maps, tables, diagrams and text let you find your way around the heavens without setting circles or memorizing constellations. Excellent companion to "The Edmund Mag 5 Star Atlas." Paperbound. **E9535 $6.50**

E) The Edmund Sky Log. Helps you locate, identify & maintain an organized record of celestial observations. Hints for observing and invaluable lists of what you should look for earn this book our highest recommendation for beginning astronomers. 100 pages. Paperbound. **E9612 $11.95**

OTHER PUBLICATIONS/BOOKS FOR THE SKYWATCHER

A) Photography With Your Telescope—Details on spacing tables, image sizes and camera types. 36 pages. **E9078 $4.95**

B) Telescopes You Can Build—Details on building 27 telescopes, including 33X prismatic, 3" , 4-1/4" and 6" reflectors and 3" refractor. 35 pages. **E9065 $5.95**

C) Homebuilt Telescopes—Details, grinding, testing & polishing a homemade scope. 36 pages.**E9066 $9.95**

D) Fun With Optics—Build a magnifier, microscope, projector, kaleidoscope, etc. 32 pages. **E9050 $4.95**

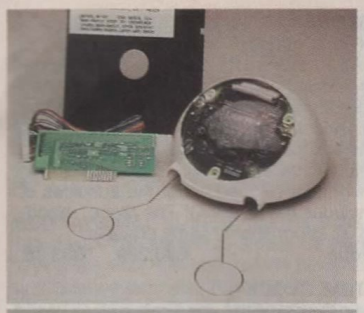
E) Telescope Optics—33-page guide of scope optics, including tables and diagrams. **E9074 $4.95**

F) Popular Optics—Data on building demo instruments, making magnifiers, testing methods, more. 192 pages. **E9445 $14.95**

G) How To Use Your Telescope—Astrophotography, planet observation finding sky objects, more. 36 pages. **E9055 $5.50**

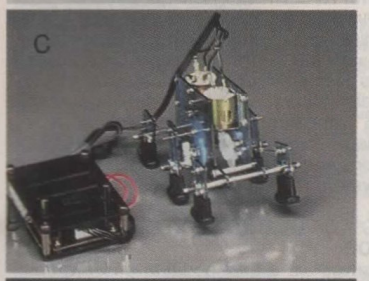
H) Mounting Your Telescope—Describes mounts, setting circles, clock drives. 36 pages. **E9082 $4.95**

I) Time In Astronomy—Covers solar time, sidereal time, star positions. **E9054 $5.50**

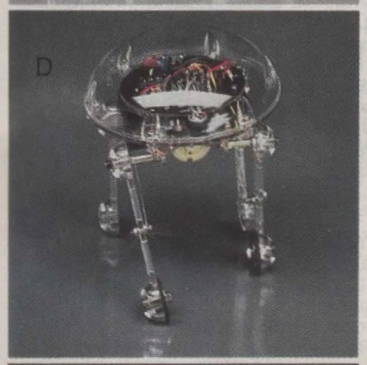


A) WAO II PROGRAMMABLE ROBOT
An intelligent robot that moves according to your program, draws straight lines and accurate circles. Utilizes two sensors and 2 DC motor movements. Features 26 keys input, 96 x 4 bit RAM, 1K ROM micro computer, preassembled printed circuit board. Powered by 1 9V and 3 "AA" batteries (not included).
WAO Robot **E36,631** **$89.95**
Optional Interface Kit for Communication with Apple II, IIE, II+
E39,273 **$45.00**

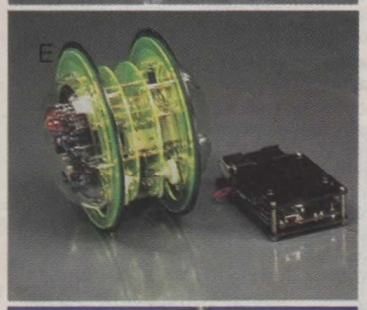
B) LINE TRACKER ROBOT
A robot that follows a black line drawn on white paper. The eye of the Line Tracker is a photo interrupter which projects and receives infrared rays. While black absorbs infrared rays, white reflects them. Features infrared sensor including IR diode/photo and diode/1 C, 2 DC motor movement and preassembled circuit board. Powered by 1 9V and 2 "AA" batteries (not included).
Line Tracker Robot
E34,355 **$49.95**



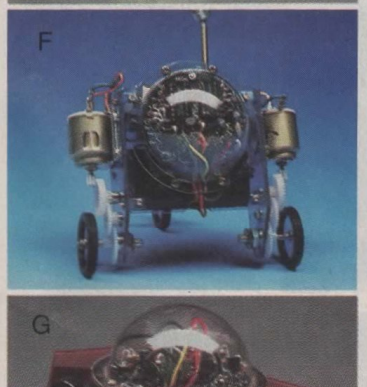
C) MR. BOOTSMAN ROBOT
Mr. Bootsman walks or runs forward or backwards, left or right using its six insect-like legs. Two speed movement. Wire control robot. Control box takes two "AA" batteries (not included).
Mr. Bootsman **E36,632** **$39.95**



D) Medusa Robot Has Electronic Brain
At your command, Medusa starts to hobble on its four legs. Stops automatically after a preset time. You register your command through a sound sensor, including a condensor microphone and transistor. Two crankshaft legs on each side. Powered by two 1.5V N size batteries (not included). Clear plastic body.
Medusa **E36,633** **$39.95**



E) CIRCULAR MOVEMENT ROBOT
Two large wheels roll this robot left and right, forward or round and round. Movements are controlled by hand-held remote control box. Robot requires three "AA" and a 9V battery (not included). Control box requires a 9V battery (not included). Green.
Circular Robot **E36,634** **$89.95**



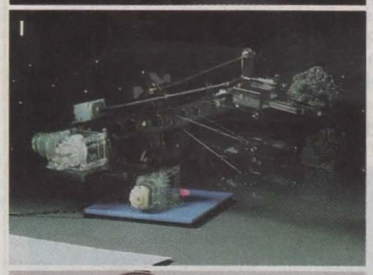
F) PIPER MOUSE ROBOT
Robot is controlled by a supersonic sound sensor and one channel electronic circuit. Use the whistle and Piper Mouse will follow your commands, turning to the left, right, forward or stop. Three wheels are driven by two DC motors. Sound sensor has condensor microphone and PC board. Two "AA" and one 9V battery (not includ.).
Piper Mouse **E36,635** **$54.95**

G) PEPPY THE ROBOT
Peppy is susceptible to noise and solid objects in its path. When sound/touch sensor in front detects an obstacle or hears a loud noise, such as a hand clap, it automatically turns left, 90 to 180 degrees, and resumes its merry way. Powered by two "AA" batteries (not incl.). Pink color plastic body.
Peppy **E36,636** **$29.95**

H) S-CARGO ROBOT
S-Cargo is controlled by a condensor microphone and a printed circuit board. A hand-held activator or your own hand clap will activate the robot's pre-programmed movements. Hi-tech sound sensor-controlled. Two "AA" batteries (not incl.).
S-Cargot **E36,637** **$49.95**

I) ROBOTIC ARM
Using the hand-held wired controller, you can direct the Robotic Arm to move small objects. Command it to grab or release, liftor lower, pivot left or right.
- **Movement:** 3 DC motors provide power to gears and drive shaft
- **Control:** Wired control box
- **Power Source:** 2 "C" batteries (not included)

Robotic Arm **E39,274** **$49.95**



J) NAVIUS PROGRAMMABLE VEHICLE
Program Navius to turn left, right, pause or go forward. As the white disk rotates, the Navius infrared sensor reads the program (black markings) that you design.
- **Movement:** 2 wheels, driven by 2 DC motors. Disk driven by 1 DC motor.
- **Control:** Programmable disk
- **Power Source:** 1 9V and 2 "AA" batteries (not included)

Navius **E39,275** **$59.95**

K) MANTA SOUND/TOUCH SENSOR
When the sound sensor comes into contact with an obstacle or hears a loud noise, such as a hand clap, it will automatically reverse itself for a preset time and then resume its new course.
- **Movement:** 3 wheels driven by 1 DC motor
- **Control:** Sound sensor - Condensor mi crophone
- **Power Source:** 2 "AA" batteries (not included)

Manta **E39,276** **$34.95**

L) SPIDER IR SENSOR AVOIDER
An intelligent robot which knows how to avoid interference. This robot emits an infrared beam which detects an obstacle in front and then automatically turns left and continues on.
- **Movement:** 3 legs on each side by crank motion
- **Control:** Infrared sensor, including infrared diode/photo diode/IC
- **Power Source:** 1 9V and 2 "AA" batteries (not included)

Spider IR Sensor **E39,277** **$62.95**

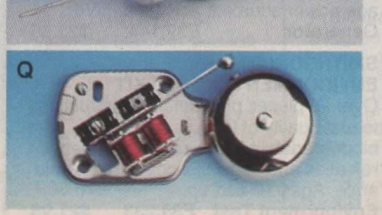
M) CATRAT REMOTE CONTROL VEHICLE
A wireless Movit that is easy to control. While the infrared remote controller button is being pressed, it moves forward. When you want to change directions, all you have to do is release the button. Control range is approximately 16 ft. It moves very quickly, so make sure you have it well under control!
- **Movement:** 3 wheels driven by 1 DC motor
- **Control:** Infrared remote control
- **Power Source:** 1 9V and 3 "AA" batteriesmain body); 2 "AA" batteries (remote control) - not included

Catrat Vehicle **E39,278** **$49.95**

***** ROBOTICS TECHNOLOGY CURRICULUM (Not Shown)**
Involve your students in familiarization and problem solving activities in robot technology. This is a complete curriculum featuring the Movit robots featured on this page. Kit includes copyright site license to reproduce all materials for classroom use plus 5 programmed learning modules and tests, activities for each robot model, research assignments, fact sheets and tables.
Robotics Curriculum **E4630** **$60.00**

N) PORCELAIN MINIATURE BULB RECEPTACLE
Porcelain cleat-type receptacle for miniature bulbs (flashlight size). Metal screw terminals, rated 75W 125V, UL Listed.
1-3/8" bottom Dia. x 7/8"H. Top Dia. 3/4".
Receptacle **E38,811** **$1.25**

O) LOW VOLTAGE ELECTRIC BUZZER
Clear tone, 2-coil electric buzzer with enclosed terminals and electronics, easy snap-off cover. 3-6 volts D.C. (battery) or 6-10 volts A.C. (transformer). 3"L x 2.5"W x 1"D.
Buzzer **E38,810** **$8.50**



P) LIQUID DISPENSING BOTTLE
Ideal for a variety of small quantity liquid dispensing jobs. 1" Dia. x 2" Long low density polyethylene, flexible and translucent. Leakproof aluminum screw-on cap with stainless steel needle 1-1/4"L x 0.036" Dia., scabbard-type cap. Capacity 25 m.l.
Pkg. of 2 Bottles **E39,048** **$5.00**

Q) 2-1/2" OPEN GONG DOORBELL
Clear tone, 2-coil doorbell with 2-1/2" dia. open gong and clapper. Enclosed terminals and electronics with snap-off cover. Runs on 3-6 volts D.C. (battery) or 6-10 volts A.C. (transformer). 5.75"L x 2.5"W x 1" D.
Doorbell Kit **E38,809** **$9.25**

EDMUND SCIENTIFIC'S NEW GIANT MOON MAP

Our full color giant 24" x 32" moon poster provides a detailed 14-1/2" diameter map of the lunar surface prepared by famed cartographer Antonin Rukl. All major features such as craters, mountains, seas, bays, valleys and manned landing sites are identified on the map. The chart also contains additional informative photos provided by astronomers George Lovi and Jay Pasachoff on the phases of the Moon, Latin names to English table and a table of manned and probe landing sites plus basic viewing suggestions.

Varnish Coated Poster Stock
E4598 $9.95
Kimdura Plastic Stock E4599 $14.95

STUDENT PLANETARIUMS LIGHT YOUR CEILING WITH STARS

A) Rotating Globe Planetarium.
Only requires a darkened room. 16-1/2" H x 8-1/2" W. Includes rotating globe, star charts, lighted pointer and instructional book. 2 "D" batteries required (not incl.).
Planetarium E31,891 $44.95

B) The Star Machine.
Projects more than 300 stars & constellations onto the ceiling or wall. Use the red star flashlight beam to point out stars. Kit includes 5 Constellation Masks, Star Dome with Base and Battery stand. Narrated Cassette and an illustrated Book of the Universe. Takes 2 "C" and 2 "A" batteries (not inc.).
The Star Machine E37,758 $39.95

ASTROPILOT COSMOS GLOBE

- **Accurate Model of Observable Cosmos**
- **Illuminated And Glows In The Dark**
- **Easy To Use Illustrated Guide**

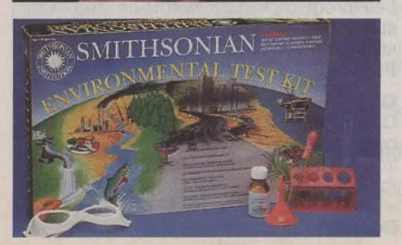
Our Astropilot Cosmos model is a clear acrylic 5 inch diameter globe depicting 868 stars and all the major constellations of the Universe. A horizon ring rests on the globe to determine the visible sky from your location. The globe rests on an attractive black base which contains the illuminator (powered by 4 "AA" batteries, not included). Charged by the illuminator or daylight, the stars glow in the dark. Comes with fully illustrated easy to use guide book.
Astropilot E38,909 $34.95

HAPPY AND UNHAPPY BALLS

Two seemingly identical black spheres, with marked differences in their physical properties. They have the same density, mass, color and appearance; yet when dropped to the floor one jumps wildly, the other is motionless. Marvelous thought provoker for discrepant event science. Fact sheet on physical and chemical properties plus experiments for classroom use included. **E39,129 $3.25/Pair**
10 Pair or More $2.75/Pair

HAND-CRANK LOW VOLTAGE GENERATOR

Create electrical current with a hand-cranked, low voltage power source. This generator is ideal as a battery replacement in a wide variety of basic electricity experiments at all grade levels. This ingenious device generates student interest as well as 5 volts of DC current - directly producing electrical energy with hands-on student effort. This see-through hand generator is made from a sturdy ABS resin with nylon-plastic gears and handle. It produces approximately 200mA of usable current whose polarity can be reversed by simply reversing the rotation of the handle. When charged by a low voltage power source it acts as a motor.
Generator E39,144 $25.95



SMITHSONIAN ENVIRONMENTAL TEST KIT

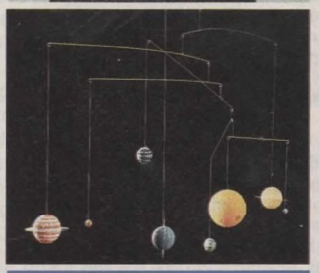
Over 25 pieces plus detailed instructions to test quality of land, water and air. Test biodegradability, acid rain, formaldehyde releases and more. Requires adult guidance. Ages 10 and up.
Envionrment Test E39,233 $21.95

MOON GLOBE

The Moon is recreated in masterful detail with this official NASA model. 12" diameter globe designates the first American and Russian unmanned landing sites and the first Apollo manned landing location. Painstaking detail of craters, seas, mountains and plains gives this globe a striking three dimensional effect. With globe base. 15" overall height. Developed under the auspices of NASA. Includes the "Story Of The Moon" handbook and 32 informational study projects.
Moon Globe E80,299 $33.95

LUNAR TIME CLOCK

Try tracking the day with Luna Time, a clock based on the 24 hour and 50 minute daily rotation of the Moon. Quartz clock shows actual position of the Moon at your selected location, when it will rise and set and the phase it is in. Acrylic 6" x 6" x 5/8" clock. Powered by one "C" battery (not incl.). Explore the mystery behind scientific research claims that the body's natural cycle matches that on the lunar, or circadian day.
Luna Time E35,262 $49.95



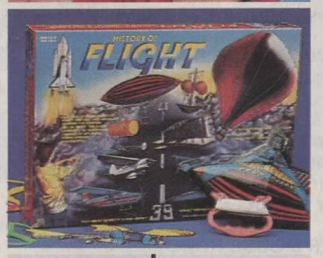
SOLAR SYSTEM MOBILE

- **3-D and Kinetic**
- **Hand Painted**
- **Sun With Nine Orbiting Planet Models**

Each planet moves freely in its own orbit. Earth with orbiting moon, Saturn with rings, 15 shades of colors realistically illustrate sun spots, belts, zones, red spots as seen in recent observations. 48-1/2" orbiting diameter with nine stainless steel pivoting arms. 26" drop from ceiling. Pre-balanced, fully-assembled. Includes ceiling swivel, installation instructions and solar system data sheet.
Solar System Mobile E36,945 $59.95

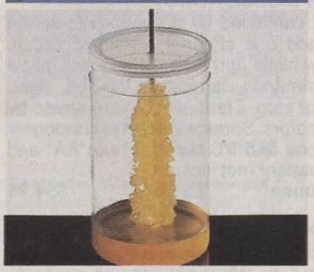
COSMIC™ STAR AND CONSTELLATION LOCATOR

The Cosmic™ is a fully portable and superbly designed guide to the stars in the shape of a kaleidoscope. Through an instant adjustment, any date and hour can be set to identify the constellations and star positions. By looking through the viewer a vividly labeled microfiche star map shows the exact alignment of the stars. It can be used in all countries between 30° and 60° North Latitude by using 3 interchangeable adapters. 8" Long x 2-1/4" Dia., weighs 6 oz.
Cosmic™ Star Locator E38,104 $25.95



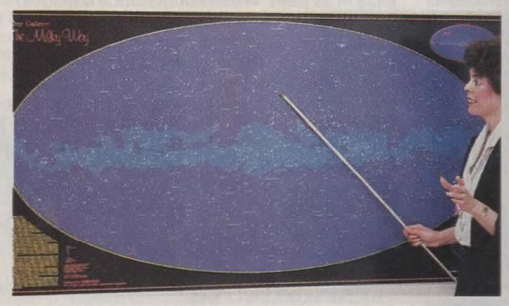
HISTORY OF FLIGHT MODEL KIT

Kit contains instructions and components for building 10 historic aircrafts and balloons. Conduct experiments in principles of flight using 1903 Wright Brothers Aeroplane, Lockheed P-38, Space Shuttle. Build and fly a 4 foot hot air balloon; lots more. Assembly required; ages 8 and up.
Flight Model Kit E39,232 $19.95



ROCK CANDY CRYSTAL GROWING EXPERIMENT KIT

Grow your own sugar stick and learn how it is done. Crystals will grow to full size. Kit contains enough sugar for one experiment. Kit includes a science guide, dissolving jar and lid, one starter stick and sugar for one experiment. Artificial colors and flavors. Yellow #5 and #6. All ingredients are safe and edible. (A candy thermometer is required, but not included in this kit.)
Candy Crystal Growing Kit E39,234 $10.50



GALAXY/MILKY WAY GIANT WALL CHART

- **68" X 36"**

Magnificent 36" x 68" wall chart features 9,100 stars, 250 deep sky objects (clusters, nebula, galaxies) and the constellations. Scientifically accurate, it depicts the entire sky in a single view. Printed on varnished high gloss poster paper. Nucleus of Milky Way is at center of chart. (Not fully shown).
E38,074 $19.95

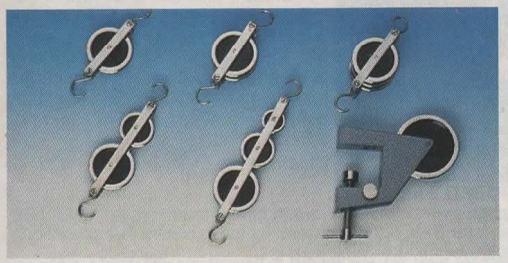
SOLAR MOBILE

The sun and all nine planets are represented by the best, most stricking artist's renderings of NASA photos printed in full color on sturdy cardboard. Mobile measures 3-1/2' across when fully assembled. A beautiful mobile for the classroom or home.
Solar Mobile
E38,075 $19. 95

EDUCATIONAL SUPERCONDUCTING CERAMIC DISC
• Demos - The Meissner Effect Of Magnetic Levitation
This is the new material making headlines in newspapers and science journals. This super conducting disc is composed of Yttrium Oxide, Barium Oxide and Copper Oxide. Critical temperature is 83°K. The disc will positively demonstrate the Meissner effect by magnetic levitation of a small Samarium Cobalt magnet at liquid nitrogen temperature (77°K). To conduct the demonstration you will need the disc, a small samarium cobalt magnet and liquid nitrogen. Liquid nitrogen is locally available from most hospital and lab supply firms. ES offers the disc and magnets. (Similar magnets may be found in lightweight headphones).
Superconductivity Disc—Includes ceramic 1" dia. x 1/8" thk. disc, and complete instructions.
Price Breakthrough! **E37,446** **$17.50**
2 or More, $16.50 Each

Rare Earth Cobalt Magnet.
3/16" diameter x 1/16" thick. **E38,168** **$25.00**
5/16" diameter x 1/16" thick. **E37,447** **$35.00**
Demonstration Kit. Includes superconductivity disc 1" dia. x 1/8" thk., rare earth magnet 3/16" dia. x 1/16" thk. and instructions. **E38,169** **$36.00**
"Superconductivity—The Threshold of a New Technology", by Jonathon L. Mayo. 144-page paperback book describes the properties and applications of superconductivity. **E4189** **$13.95**
CAUTION: Please, before you order, be sure you are qualified to handle liquid nitrogen and that you have a local source for this substance.

A PIECE OF PLASTIC WHICH GENERATES ELECTRICITY
Unique, flexible Kynar film from Pennwalt has high piezo and pyroelectric activity. Pliant, flexible, tough and lightweight, unlike transducer materials. Not affected by high humidity. Readily laminated into bimorph stacks, which increase the mechanical motion generated in cantilever devices. Specialty film is useful for keyboards, keypads, microphones, stereo headphones and speakers, biofeedback experiments, laser applications, as sensors for medical and industrial instrumentation. Pyroelectric output is useful in fire and intruder alarms and energy-control systems. Acoustic impedance is close to that of water, making it useful to be employed in hydrophones and sonobuoys. Kynar elements can produce motion in shutters, displays and motorless fans. Film can be exposed to temperatures of –40°.
Kynar Film Kit. Includes 4" x 6" piezo material; 4" x 1/4" copper conductive strip; one piece 1" x 2-1/2" piezo plastic coated with leads; instruction book. **E34,808** **$79.00**

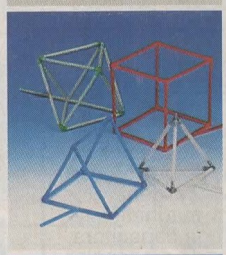


ALL METAL ALUMINUM PULLEYS
High quality pulleys feature aluminum 2" dia. grooved pulley wheel in an aluminum frame, deep-V groove and brass bearing, hooks top and bottom.
A. Single Pulley **E38,823** **$6.00**
B. Double Pulley **E38,824** **$11.00**
C. Triple Pulley **E38,825** **$14.00**
D. Double Tandem Pulley: As above, but with a 2" dia. and a 1.5" dia. pulley in tandem. **E38,826** **$11.00**
E. Triple Tandem Pulley: With a 2" dia., a 1.5" dia., and a 1" dia. pulley in tandem. **E38,827** **$14.00**
F. Table Clamp With 3" Pulley: Rugged cast "C" clamp (1.40" Maximum Opening) with 3" dia. pulley wheel on brass bearing, accepts 0.50" pole mount. **E38,828** **$22.00**
G. ECONOMY PULLEYS (Not Pictured)
Similar to above, but with 2" dia. nylon pulley wheels and lightweight aluminum frames.
Single Pulley **E38,829** **$2.60**
Double Pulley **E38,830** **$3.20**
Triple Pulley **E38,831** **$4.20**
Quadruple Pulley **E38,832** **$5.20**
Double Tandem **E38,833** **$6.90**
Triple Tandem **E38,834** **$7.50**

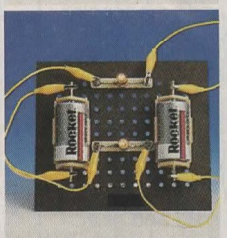
THE TAPWATER TOUR TEST KIT
A "hands-on" science curriculum and water test kit designed for grades 4-8. The Tapwater Tour is divided into five exciting units which help students discover what is found within their home tapwater. Conduct your own tests using simple and safe reagent tablets in unit-dose form. Complete with lecture materials, illustrated hand-outs, teacher tips, test procedures and fascinating wrap-up games to reinforce key concepts within each unit. Components for a class of 35 children. Replacement tablets available. Tests included: pH, Chlorine, Harness, Iron, Copper.
The Tapwater Tour **E38,812** **$54.95**
Refill Materials (35 student pkg.) **E38,813** **$39.95**

WATER QUALITY TEST KIT
• Taste-Odor-Color-Turbidity
A complete kit for teaching or learning the basics of water quality. Kit includes detailed instruction manuals plus necessary materials for 10 tests; detection of chlorine, removal of taste, odor, color and turbidity with activated charcoal.
E38,815 **$29.95**

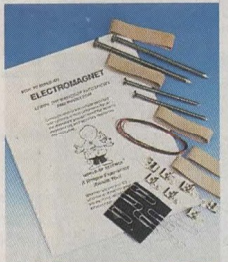
SOIL TEXTURE TEST KIT
Dispersing and flocculating reagents separate soil samples into sand, silt and clay fractions in special calibrated conical tubes in a plastic display stand. Makes 50 tests. Instructions and 20-page booklet on soil science.
E38,816 **$34.95**



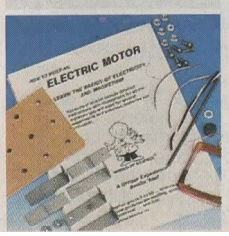
ELEMENTARY KUBIC BUBBLES KIT
Repeat some of the classical experiments of Joseph Plateau involving problem solving with soap film. Simple frameworks and plates dip into soap solution . Each kit consists of four frameworks: Tetrahedron, Cube, Octahedron, Triangular Prism.
E38,820 **$14.95**



BASIC ELECTRIC CIRCUITS KIT
Connect batteries, wires and bulbs in various combinations to try to make bulbs light. They can be connected in a multitude of ways. Some arrangements work, some won't. Real batteries, bulbs and clip leads are supplied. Battery and bulb in special holders are fastened to a "big board" by the students. Alligator clips enable the students to make connections.
E38,822 **$23.95**



HOW TO BUILD AN ELECTROMAGNET
Learn the basics of electricity and magnetism by building your own electromagnets and conducting basic experiments. Kit includes full instructions, conductive nails, copper wire, fahnstock clips and battery holder parts. (Requires batteries , not included.)
E38,819 **$9.95**



HOW TO BUILD AN ELECTRIC MOTOR
Learn the basics of electricity and magnetism as you build your own battery-powered permanent magnet electric motor. Kit includes instructions, magnets, copper wire, armature, brushes and all the parts required (battery not incl.).
E38,818 **$9.95**

GARDEN SOIL TEST KIT
A simple, economical kit for soil science education or home gardening. Rapid test procedures and laminated color charts give low-medium-high concentrations for nitrogen, phosphorus and potassium (15 tests each). A pH indicator and color chart cover the range pH 4.0-9.0 (30 tests). A garden guide manual and soil handbook interpret test results and give lime and fertilizer recommendations.
Garden Soil Test Kit **E38,814** **$39.95**

FORMALDEHYDE AIR POLLUTION TEST KIT
A compact test kit with one Passive Bubbler™, complete supplies for three tests and a Formaldehyde color chart. Color chart values of 0-1.0ppm Formaldehyde allow the analyst to easily determine if a Formaldehyde contamination is present. Compact and easy-to-use air sampling device that eliminates the need for electronic or manually-operated pumping equipment. This unique sampler only needs to be placed in the environment which is to be evaluated. The air is absorbed through a patented Teflon® Knudsen diffusion disk and into an absorbing solution. The test sample is then reacted with standard reagents to produce colors which are visually measured with Octet Comparators. **E38,817** **$44.95**

SMOKING EXPERIMENT KIT
Demonstrate the amount and nature of the tars and nicotine produced by modern cigarettes. The experiments are based on a simple aspirator which draws smoke from a lighted cigarette through a high efficiency white fiberglass filter. As the cigarette is lit and smoked, all the nicotine and tars are collected on the filter paper. The color and the odor of the filter paper are powerful proof of the dramatic and harmful effects which cigarettes may have on the body. The material on the filter paper may be extracted for further experimentation. **Contents:** 1 Filter Holder and Stand, 1 Color Chart, 1 Aspirator Bulb, 1 Teachers Handbook. **E38,821** **$36.95**

LEAD CHECK TEST SWABS
• Results in Minutes
• Easy to Interpret
According to the EPA, one out of every two homes in the USA contains toxic lead paint. Work environments may even be worse. In addition to paint, lead contamination is found in dinnerware, coffee mugs, drinking water from lead soldered pipes, imported toys, soil and dust. Lead check swabs allow you to quickly test for lead with reliable and consistent results. The entire test takes only seconds. Simply wet the swab with solution provided, rub on test surface and a pink color develops at the tip of the swab in the presence of lead. Detects to 2 ppms; kit contains swabs, control strips and solution for 12 tests.
Lead Check Kit **E39,211** **$32.00**

B) ACID RAIN TEST KITS **Project Kit - 30 Tests**
Ideal for small scale testing: small group class work and field trips. Contains polythene dropping bottles with screw caps containing pH Indicator 1 (15cm3), range pH 2.5 - pH 4.5 and pH Indicator 2 (15cm3), range pH 5.0 - 7.0; pH test solutions pH 3.0, pH 5.0 and pH 7.0 (30cm3); 5 graduated test tubes, 4 x 2.5 ml measuring syringes; color card and instructions. Reagents for 30 tests (15 on each range). **E39,212** **$19.00**

Pro/Class Kit - 200 Tests
Designed for large scale testing: project assignments for large groups, surveys and field work. Contains polythene dropping bottles (100cm3) with screw caps - pH Indicator 1, range pH 2.5 - pH4.5, pH Indicator 2, range pH 5.0 - pH 7.0; pH test solutions pH 3.0, pH 5.0 and pH 7.0; 16test tubes; measuring syringes; 4 color cards and instructions. 60 page teachers guidelines providing a detailed background into the geographical, geological, biological, chemical, sociological and economic effects of acid rain pollution. Project notes (15 page booklet). Includes reagents for 200 tests (100 on each range). **E39,213** **$100.00**

WARNING: HIGH VOLTAGE DANGER
While actual current is low in all of these demonstration devices, there still exists the potential of high voltage shock. We recommend extreme caution and knowledgable adult supervision at all times when operating these instruments.

200,000 VOLT VAN DE GRAFF GENERATOR IS A CLASSIC DEMONSTRATOR OF ELECTROSTATIC ENERGY...IDEAL FOR SCIENCE CLASSES AND LAB WORK

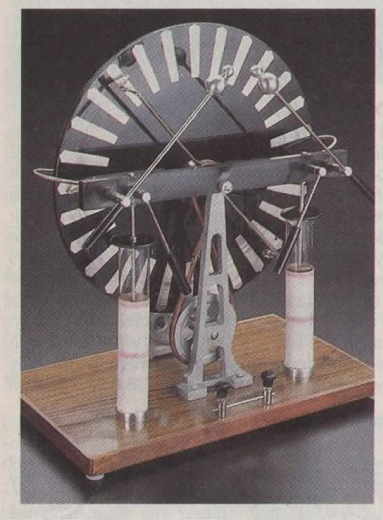
Demonstrate lightning, lightning rods, St. Elmo's fire, repulsion of like charges, electrostatic dust collection, the flow of ions. Deluxe, high-quality generator is 17" tall and is equipped with a 6-3/4" aluminum top ball. Powered by a 5,000rpm, 110VAC motor, it has a humidity range of 0-90% and generates a current of 1.5 to 2.5 microamps. Aluminum base housing, frame and charge collector. Unbreakable plastic insulating column. Comes assembled with instructions.

Van De Graff Generator **E70,264** **$159.95**
Extra Band **E42,012** **$4.95**

A) Electric Whirl Demonstrator. 9" dia. wheel with radial spokes on a cone bearing. Spins rapidly when near an electrostatic generator. **E36,246 $28.50**

B) Volta's Hail Storm. Transparent cylinder, 2-3/4" dia. x 2-1/2" L. Place pith ball/aluminum foil bits in cylinder and position near Van De Graff Generator to demonstrate storm action. Not shown. **E36,247 $34.95**

C) Electrostatic Plume Demonstrator. Brightly colored plastic strips mounted on a rubber vacuum cup for attaching to the dome of a Van De Graff Generator. Strips repel each other and stand up when excited. **E36,248 $13.95**

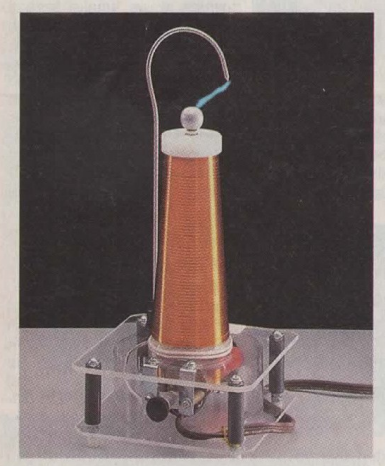


WIMSHURST ELECTRO-STATIC GENERATOR

•Generates Up To 75,000 Volts

Ideal classroom demonstration device for electrical and physics experiments. Unit consists of two 9-3/4" diameter circular plastic plates which are rotated in opposite directions by a drive belt mechanism. Cemented onto each disc are a number of metal foil sectors which both generate and carry small charges of electricity to be stored in the capacitor. Each sector accumulates the charges derived by influence with the other sectors. Diagonal neutralizing brushes on the front and back distribute the correct charges to the sectors as they revolve. Two additional pairs of brushes collect the accumulated charges and transmit them to the storage capacitor. The brushes also are connected to spark gap electrodes. As the plastic discs revolve, a high voltage spark will jump between the electrodes as they are gradually brought together. Static electricity is stored in the Leyden Jar condenser until discharged. Two swinging arm dischargers with insulated handles are built-in and unit is mounted on a wooden base. Stands 15" tall. Instructions included.

Electrostatic Generator **E70,070** **$145.00**



A LOT OF WATTS...OUR TESLA COIL CAN GENERATE UP TO 50,000 VOLTS OF ELECTRICITY

•A Great Classroom Demonstrator
•Includes 21 Energy-Related Experiments

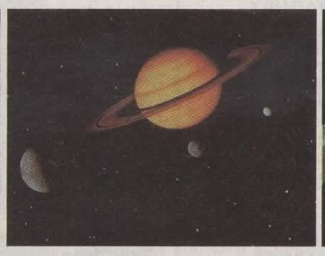
Radiate high frequency energy through space or light fluorescent tubes two feet away with this unique 50,000 volt capacity generator. High frequency generator utilizes an alternating current, electro-magnetically-operated interrupter buzzer, high voltage capacitors, high voltage inductive coil transformer and a monopolar high frequency transformer generator. Generator is housed in a 6 inch square and 2 inch high plastic safety cover with insulative base. The high frequency is produced in the form of decrement waves resulting in output rich in harmonics. Includes standard bulb socket which enables user to connect radiator to coil top, small neon lamp, discharge electrode, two radiation antenna plates and book describing 21 experiments. 115V, 60Hz. Unit stands 11" high without attachments. With six foot grounded cord and plug.

Tesla Coil **E70,301** **$179.95**

ROOM SIZE SPACE SHUTTLE WALL MURAL

Giant mural comes in eight rolled sections of strippable 80 lb. poster stock with fully washable surface. Latest laser separation technology provides exceptional visual detail without graininess. NASA's orbiter is depicted hovering above distant Earth. 8'3" H x 13'8" W.

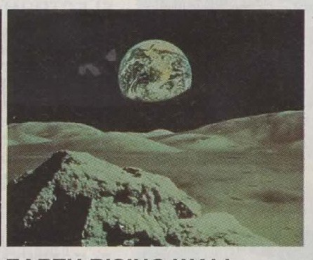
Mural **E36,820** **$39.95**



SATURN WALL MURAL

Bold mural of Saturn and its three moons . 8'6" H x 13'8" W mural. 80 pound poster stock for durability. Varnish coated. Washable. Can be trimmed for smaller rooms.

Mural **E35,444** **$39.95**



EARTH RISING WALL MURAL

Giant 8'6" H x 13'8" W mural of Earthrise is a vivid, colorful panorama of Mother Nature at her best. Eight easy-to-handle sections. Long-lasting 80 pound poster stock, varnish coated and fully washable.

Mural **E83,029** **$39.95**

ELECTROMAGNETIC SPECTRUM CHART

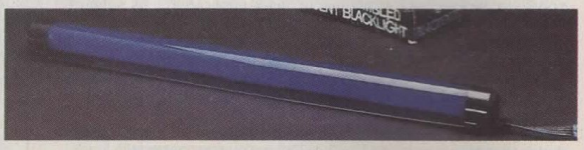
Developed by Westinghouse and San Francisco's Exploratorium, chart is a series of circular bands moving outward from center which describe the electromagnetic waves. Range 10^{10} cm to sub atomic 10^{-14} cm wavelength scale. Other information includes: frequency scales, general and specific names, radio and microwave usage, black body curves, emission spectra and atmospheric absorption bands. Measures 24" x 33", printed on poster stock in full color.

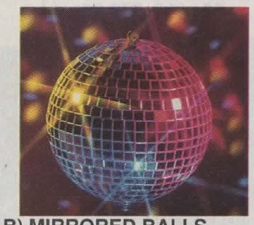
Spectrum Chart **E36,861** **$10.95**

REGULATED TEST BENCH POWER SUPPLY

Provides four separate, fully regulated supplies. Three are fixed and yield +5VDC at 3 amps, -5VDC at .05 amps, or +12VDC at 1 amp. The fourth supply is variable, producing 2 to 20 volts of DC output at up to 2.5 amps. Line and output voltages are regulated to within 0.05 volts, and the supply is linear. Linearity means that the output voltage will remain virtually constant as set in spite of wide variations in the load or the primary source voltage. All four supplies are shortproof as well. A current foldback circuit in each supply collapses the field in the event of a short, a current surge from the line, or an excessive current demand. Measures 3-1/4",x8-1/4" x9-1/4", 3-wire grounded power cord for 115VAC operation, panel meters for both current and voltage, and standard jacks for accessing the four regulated supplies. Industrial overstock.

Regular Price $125.00 **ES Special Sale E38,360** **$87.50**





A) FLUORESCENT BLACKLITE

For brilliant blacklite effects, this 18" long, 15W blacklite tube illuminates large areas of posters, paints, walls, etc. Completely assembled unit comes with screws and instructions for mounting. Includes reflector, 6 ft. cord, on/off switch. 118V, 0.35amp, 60Hz. UL listed.

Blacklite **E34,501** **$29.95**

B) MIRRORED BALLS

Create unique window displays and light shows.

10" Diameter Ball. Acrylic mirrors. Includes ceiling mounted motor and decorative fixture. Weighs 3 lbs. **E33,785** **$52.95**

16" Diameter Ball. Heavy-duty ball for dance halls. Glass mirrors. Weighs 13 lbs. Without motor. **E85,180** **$160.00**

Motor For 16" Diameter Mirror Ball **E35,885** **$69.95**

UNIQUE DRY ICE MAKER

Dry Ice Maker is a completely mechanical attachment that fits any standard, syphon-tube equipped, carbon dioxide cylinder (available from any welding supply company). 25% CO_2 conversion efficiency. Makes dry ice convenient for hospitals, chemistry labs, etc. Easy to use: just clamp on collection bag and turn CO_2 valve. With adapter nozzle, cone, collection bag clamp, washer, and instructions.

Dry Ice Maker **E71,533** **$64.95**

Collection Bag **E41,626** **$7.50**

POLIOPTICON OPTICS EDUCATION KIT

- **Build 10 Working Optical Instruments**
- **Learn Basic Principles Of Optics**

Poliopticon is a 25-piece construction and experimentation set that lets you build 10 working optical instruments. Easy-to-follow instructions make assemblies fun while you learn the basic principles of optical elements. Mechanical components are made of brightly colored, high-impact plastic and optics are made of optical-grade acrylic. Build the following instruments:

13X Inverted Image Microscope
13X True Image Microscope
2X Galilean Telescope
3X Galilean Telescope
3X Galilean-Type Binocular
6X Astronomical Telescope
6X Spotting Telescope
3X Magnifier
6X Magnifier Loupe
Kaliedoscope

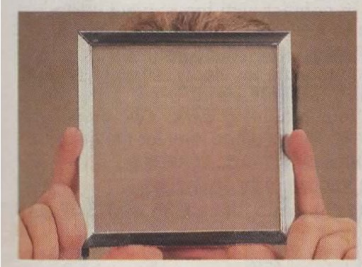
Poliopticon Kit **E38,411** **$39.95**

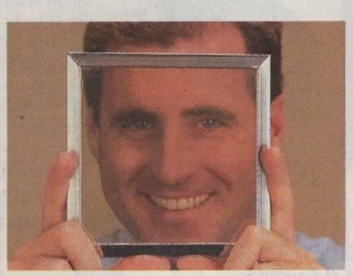
BED-SPECS PRISM GLASSES

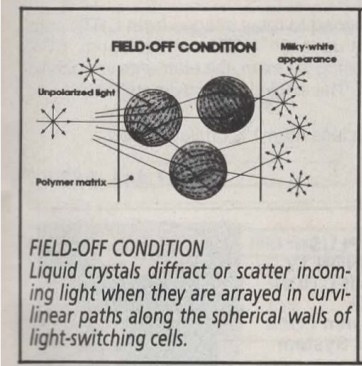
- **Lie Flat In Bed And Watch TV Or Read With These Ingenious, Hard- To-Find Glasses**

Precision ground, polished and aligned optical glass prisms produce right-side-up image that is also correct left to right. Recommended by doctors for bed-ridden patients. Lightweight, can be used with your normal eyeglasses. Soft case included. Prescription not required.

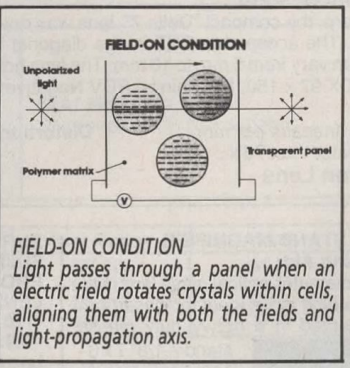
Bed Specs Prism Glasses **E61,039** **$34.95**







FIELD-OFF CONDITION
Liquid crystals diffract or scatter incoming light when they are arrayed in curvilinear paths along the spherical walls of light-switching cells.



FIELD-ON CONDITION
Light passes through a panel when an electric field rotates crystals within cells, aligning them with both the fields and light-propagation axis.

LIQUID CRYSTAL LIGHT SHUTTER WINDOWS

- **When Voltage On, Window is Clear; Off It Is Translucent**

Unique new electronic window consists of a liquid crystal emulsion spread between sheets of conductive plastic film (frame not incl.). Operates on 60 to 90 volts AC/60c, draws approximately 20mA per square foot. When voltage is off, liquid crystals diffract or scatter incoming light to create a translucent condition. Can be controlled with a rheostat to vary clarity. Innovative material has potential as display/sign material, light shutter, glare control and vision testing. Transmission of light is greater than 70% in the "Off" condition (no image). Response time: "On" condition takes 10 milliseconds; "Off" condition takes 30 milliseconds. Requires simple electrical wiring. Maximum operating temperature is 120°F. Instructions included.

Size	On/OffCondition	Stock No.	Price
1'x 1'	Clear/Frost	E37,539	$170.00
1'x 3'	Clear/Frost	E37,541	$490.00

ROTATABLE DUAL-AXIS, HEIGHT ADJUSTABLE POLE STANDS

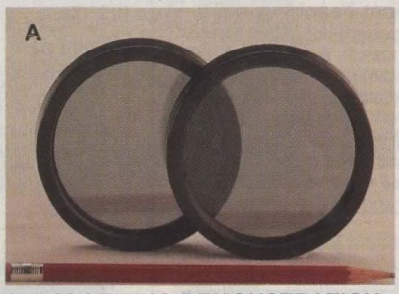
- **Rotatable 360° In Both Horizontal & Vertical Axis**

Ideal classroom or museum demonstration aids. Each unit features a heavy-duty cast iron V-shaped base with chrome post 12 mm dia. x 130 mm. Overall units stand 8-3/4" tall to center axis and are adjustable to a maximum height of 10".

1) Equilateral Prism And Stand:
4" long prism with 1"faces; *ideal spectrum demonstrator.* **E38,602** **$25.00**

2) Double Convex Lens: 3"dia. lens x 10"fl; magnifying lens. **E38,603** **$19.00**

3) Double Concave Lens: 3"dia. lens x -9"fl; reducing lens. **E38,604** **$19.00**



A) POLARIZING DEMONSTRATION DISCS

- **Large 3" Diameter Clear Aperture**
- **Safety Ring Mount**

Ideal for classroom demonstrations, our 3" clear aperture polarizing discs are sandwiched between protective glass and mounted in high-impact plastic retaining rings for safe, easy handling. Demonstrate variable transmission of light or check stress patterns in plastics, liquid crystals, glass and minerals placed between the discs.

Diameter: O.D. 3-7/8" (98 mm)
Clear Aperture: 3-1/8" (80 mm)
Edge Thickness Rings: 5/8" (16 mm)
Center Thickness: 1/4" (6 mm)
Transmission: ≈ 40% over visible
Efficiency: ≥99% **Extinction:** 700

Set of 2 Mounted Discs **E38,605** **$30.00**

B) NEWTON RING (FIZEAU FRINGES) DEMONSTRATOR

Newton Rings are frequently specified as a surface quality requirement in optical manufacturing. In this process a precision test plate is applied to the in-process work and the observed newton rings display the accuracy of the work piece. The uniformity of the rings represent a contour map of the two interfacing surfaces. Our demonstrator is two ground and polished flat windows mounted between two high-impact plastic rings with four variable tension adjustment screws. By varying the tension and/or placing very thin interference material (ex.: thin paper strip) between the glass surfaces, various contours may be observed and the associated newton ring pattern.

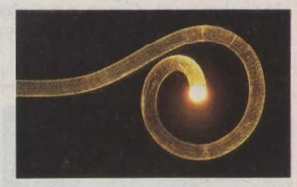
Frame
Outer Diameter: 105 mm
Clear Aperture: 80 mm
Overall Thickness: 39 mm

Window Optics
Diameter: 83 mm
Substrate: Soda Lime Glass

Newton Ring Demonstrator **E38,606** **$39.00**

DIFFRACTION GRATING-TYPE HAND SPECTROSCOPE

Suitable for work in the laboratory and classroom where measurement of wave lengths is not necessary. Useful for viewing the bright lines of metals in flames, of gases in discharge tubes as well as the absorption spectra of solutions and of colored glasses. Metal body with black oxide finish. Dispersion is by means of a 15,000 lines per inch replica diffraction grating. **E36,257** **$89.00**



LUCITE ROD

Length of rod bent in the form shown. Is a splendid piece for demonstrating the piping or bending of light by internal reflections in a solid rod of lucite. ILength is 2' x 12mm dia.

E36,863 **$22.95**

SELF-SCREENING VISION TESTER

Vision tester is an easy way for you to check your distance and reading vision power. Unit consists of a sliding target, a 10-1/2" long scale and a built-in viewing lens. Check and monitor your sight in conjunction with your eyecare professional. **E38,624** **$12.95**

PIEZO ELECTRIC FAN

Powered with 110V/60Hz, this solid state fan requires 1/10th the energy of rotary types and fits into small areas for spot cooling. Highly reliable; instant start; no wearing parts. 7 CFM; 1.2 ounces for that hot IC in your computer or stereo. 2.8" L, wide end 2.15" , narrow end 1" , .68" thk. Mylar blades. **E36,563** **$17.50 Each**
3 or More, $16.50 Each

OPTICS DISCOVERY KIT
• Prepared By Optical Society of America

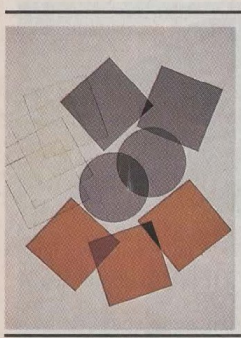
The Education Council of the Optical Society of America prepared this discovery kit to introduce students to modern Optical Science and Engineering. Working with member industrial firms, the OSA selected high quality optical components and prepared detailed instructions. Kit includes: 3 lenses, 1 fresnel, 1 mirror, 1 hologram, 1 optical illusion slide, 1 diffraction grating, 1 meter of optical fiber, 2 polarizers, 4 color filters and instructions. For 11 detailed experiments. For ages 10 to adult.

Individual Optics Discovery Kit **E39,140 $15.00**

All proceeds go to OSA.

ATTENTION TEACHERS:
OSA offers free educational materials and teacher membership opportunities; please contact:

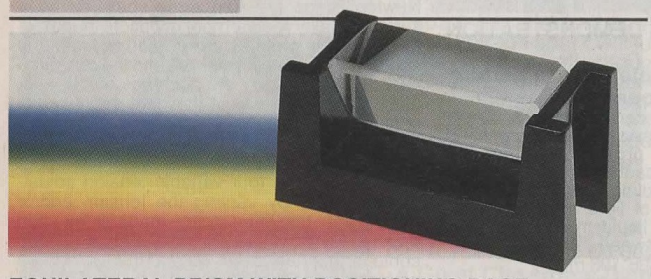
Technical Activities Manager
Optical Society of America
2010 Massachusetts Ave., N.W.
Washington, D.C. 20036
Tel: 1- (202) 416-1960



POLARIZER EXPERIMENTERS KIT
• Ideal Classroom Teaching Aid

Learn the basic principles of polarized light and perform hands-on experiments. Kit contains various pieces of polarizer and retarder materials plus a problem/experiment sheet. Eleven 2" square / 2" dia. pieces are packed in a clear plastic hinged box. Includes: square and round linear polarizers, square 1/4 wave retarder, square 1/2 wave retarder and square sunglass polarizers.

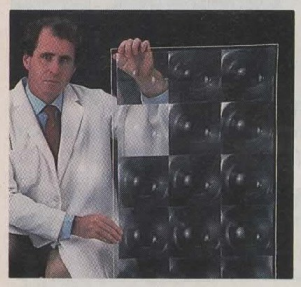
Polarizer Kit **E38,490 $15.95**



EQUILATERAL PRISM WITH POSITIONING BASE
• Ideal Windowsill Rainbow Prism

Attractive high tech base allows you to position our equilateral prism on a windowsill or table to produce a brilliant multi-color spectrum display on walls, floor or ceiling from natural sunlight. To achieve this effect,you would have to balance the prism on the peak of the triangle's roof, impossible without our specially designed mount. Glass equilateral prism is 2" (50 mm) long with 1" (25 mm) faces. Black plastic mount is 3"L x 1-3/8" W X 1-3/8" H.

Prism With Mount **E38,400 $6.95**



GIANT MULTI - ELEMENT FRESNEL

Measures 34-1/2" L x 21" W with 15 individual 6-3/4" x 6-3/4" element panels in a 3 x 5 grid matrix. Each panel focuses as would an individual fresnel lens, giving you, in effect, 15 hot spots. Originally designed for a solar energy concentrator application. Approximately 0.07" thick flexible acetate plastic sheet. Approximate focal length 10" **E38,501 $99.00**

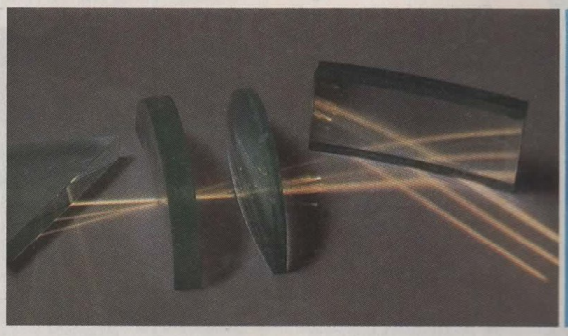
EDUCATIONAL EQUILATERAL TRIANGLE GLASS PRISM

Clear flint glass, polished to demonstrate diffraction, spectrum formation, and dispersion. Ideal for the determination of the index of refraction of glass by the pin sighting method. Two edges are ground and the opposite edge is polished.

Sides: 75 mm x 75 mm x 75 mm
Thickness: 10 mm

Educational Prism **E38,441 $7.95**

24 - Educational Optics



CLASSROOM OPTICAL RAY BOX SET

A complete basic optical laboratory in one economical set. Includes a battery powered light source box, an experiment platform and a collection of optical elements for basic instruction and experimentation. The light box has a built-in PCX collimating lens and movable 2.5V light source which allows you to both vary the intensity of the light and to direct the ray paths. This unit also houses the batteries (2 "C" cells—not incl.) and an on/off switch. The experiment platform has a back stop with three 1x20 mm slits to form the ray pattern and an 8" L x 3" W surface for positioning the optics.

Classroom Optical Ray Box Set **E38,597 $59.00**

SPECIFICATIONS:

Light Box:
Dimensions: 6-1/8" Lx2-7/8" Wx2" H
Bulb: 2.5V/0.3A
Objective: PCX Cylinder lens 40Wx20H
Experiment Platform:
Dimensions: 8" Lx3" Wx1-1/2" H
Optical Slit: Three 20 mm x 1 mm vertical slits at 6 mm intervals with mask for single slit only.

Optical Elements:
Half Bi-Convex Lens: 50 mm Dia. x 100 mm
Half Bi-Concave Lens: 50 mm Dia. x -200 mm
Right Angle Prism: 45 mm x 32 mm x 32 mm x 8 mm T
Flat Mirror: 50 x 25 mm
Convex/Concave Mirror: 50 x 25 mm x 5250 mm Radius of curvature
180° protractor

A) SURPLUS TELEVISION PROJECTION LENS

Lens originally was designed for use in a three-gun television projection system. Useful in a variety of projects. Make your own slide projector. Project color transparencies to provide a large wall image in a small space. Designed to be nearly in contact with the subject surface. Covers up to a 5" diagonal source. Three element acrylic lenses are made from optical grade methyl methacrylate for clarity, sharpness and lightweight. 5-5/8" in the front; 5-1/4" in the back excluding four mounting ears. Two-piece focusing barrel. Plano-plano lens for flat images. For exhibitors, designers, tinkerers.

Priced at a fraction of its original cost.

114 mm f1.3 Lens **E35,890 $42.95**

B) SURPLUS ANGLED TV PROJECTION LENS
• F.L. 102.4 mm/f1.0 System

Originally built for Sharp, the compact "Delta 7" lens was designed to relay images from CRTs onto various screen sizes. The acceptable CRT image diagonal is up to 5" (127 mm) maximum; CRT faceplate thickness can vary from 5 mm to 16 mm. The lens housing is Lexan, the elements are acrylic (several meniscus DCX 97 x 150, F.S. mirror, PCV Negative). The angle is approximately 40°.

SPECIFICATIONS:
Resolution: min. 3 linepairs per mm.
Transmission: greater than 78%.
Distortion: less than 1% on flat screen.

Surplus Projection Lens **E37,448 $42.95**

FOLDABLE GIANT STAND MAGNIFIER
• Classroom Teaching Aid

Featuring a giant 4" diameter optical glass lens, this 2X magnification teaching aid is ideal for classroom demonstrations. Mounted in a heavy duty plastic stand 7-1/8" T x 6-1/2" L x 5-1/4" W which folds in upon itself to a compact 1-5/8" Tall. The base has both a 4" and a 100 mm measuring scale molded into the frame.

SPECIFICATIONS:
Mag: 2X
Lens Dia: 4"
Working Dist: 6-1/2"
Field of View: 7"

Magnifier **E38,599** **$8.50**

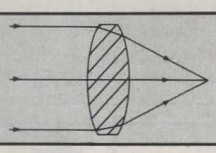
SURPLUS FUJINON TV PROJECTION LENS
•110 mm f.l./f 0.95 System

Lens was originally designed for use in Fujinon big screen TV projection system. Ideal component for do-it-yourself projects such as a slide/transparency projector. Lens projects a large screen image in a short distance. Lens is designed to be in contact with the subject surface and covers up to a 4-1/4" diagonal source. Multi-element coated acrylic lens system is made from methyl-methacrylate for image quality and lightweight feature. Mounted in a Lexan housing 8" Tx5-1/2" Dia. with 4.91" Dia.—13TPI x 1.15" L threads on the base. Objective lens diameter is 115 mm.

Projection Lens **E38,598 $42.95**

EDUCATIONAL GRADE DEMONSTRATION OPTICS

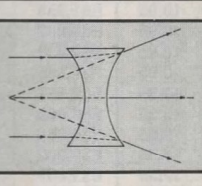
To serve educators we have designed a systematic matrix of basic lens and optical components which are economically priced and ideal for classroom demonstration and experimentation.



DOUBLE-CONVEX LENSES (DCX)

Double-Convex lenses are lenses which have two outward curving faces. Their faces may be symmetric or they may have one curve sharper than the other. Double-Convex Lenses have a positive focal length (F.L.) and will act as a magnifying or condensing lens.

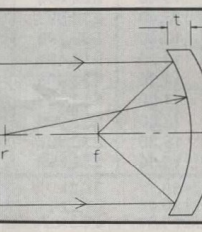
Dia.	Focal Length	Stock Number	Price
38mm	50mm	E37,787	$4.00
38mm	100mm	E37,788	$4.00
38mm	150mm	E37,789	$4.00
38mm	200mm	E37,790	$4.00
38mm	300mm	E37,791	$4.00
50mm	50mm	E37,792	$4.25
50mm	100mm	E37,793	$4.25
50mm	150mm	E37,794	$4.25
50mm	200mm	E37,795	$4.25
50mm	250mm	E37,796	$4.25



DOUBLE-CONCAVE (DCV)

Double-Concave lenses have two inward curving surfaces. Negative focal length (F.L.) and act as reducing or dispersal lenses.

Dia.	Focal Length	Stock Number	Price
38mm	−100mm	E37,797	$4.00
38mm	−150mm	E37,798	$4.00
38mm	−200mm	E37,799	$4.00
50mm	−100mm	E37,800	$4.25
50mm	−150mm	E37,801	$4.25
50mm	−200mm	E37,802	$4.25



SECOND SURFACE RADIUS MIRRORS

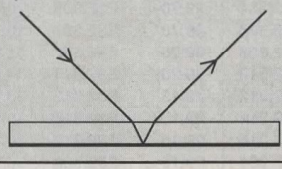
Radius Mirrors are curved surfaces, usually spherical, that have been aluminized and overcoated. If concave, the mirror has a positive focal length and will focus light. If convex, the mirror has a negative focal length and will disperse light. All of the Radius Mirrors listed below are glass.

CONCAVE

Dia.	Focal Length	Stock Number	Price
38mm	25mm	E37,803	$2.95
38mm	50mm	E37,804	$2.95
50mm	25mm	E37,805	$3.75
50mm	50mm	E37,806	$3.75

CONVEX

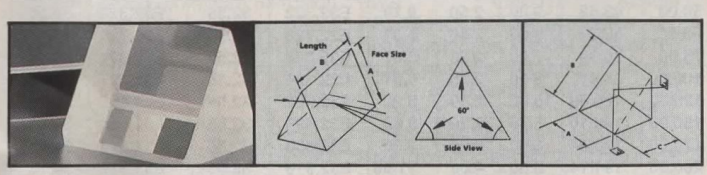
Dia.	Focal Length	Stock Number	Price
38mm	−25mm	E37,807	$2.95
38mm	−50mm	E37,808	$2.95
50mm	−25mm	E37,809	$3.75
50mm	−50mm	E37,810	$3.75



FLAT MIRRORS

Aluminized on the back surface.

Dimension	Thickness	Stock Number	Price
38mm Dia.	3mm	E37,811	$3.25
38mm Sq.	3mm	E37,812	$3.25
50mm Dia.	3mm	E37,813	$3.75
50mm Sq.	3mm	E37,814	$3.75



EQUILATERAL PRISMS — 60°

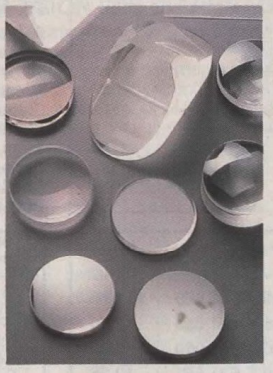
Equilateral prisms have three equal 60° angles. They are ideal for demonstrating how a beam of light breaks into the colors of the spectrum. All are made of optical glass.

Face Size	Length	Stock #	Price
25mm	25mm	E39,124	$ 4.45
25mm	50mm	E31,801	$ 5.35
25mm	75mm	E31,797	$ 5.75
25mm	100mm	E31,798	$ 6.85
25mm	150mm	E31,799	$ 9.25

RIGHT ANGLE PRISMS

Right angle prisms are generally used to achieve a 90° light path bend. Images viewed through a single right angle prism will be erect but reversed left to right. While the relative positions of the top and bottom of the image will be the same, the right and left sides will be interchanged.

A	B	C	Stock Number	Price
25mm	25mm	25mm	E39,123	$ 8.00
50mm	35mm	25mm	E31,800	$12.10



EDMUND EDUCATIONAL OPTICS SET

Includes all the basic size-compatible optical components necessary to teach and demonstrate the basic principles of optics and optical instruments. All optics are industrial grade precision glass elements and complete instructions are included.

SPECIFICATIONS:

Description	Size (mm)	F.L. (mm)
Achromat	25 dia.	25
DCV Lens	25 dia.	−75
DCX Lens	25 dia.	25
PCX Lens	25 dia.	75
Fresnel Lens	35×35 sq.	25
Equilateral Prism	25×50	—
Right Angle Prism	35×50	—
First Surface Mirror	35 dia.	—
Convex Mirror	25 dia.	62
Concave Mirror	25 dia.	−25

Classroom Optics Set E37,445 $79.00

EDUCATIONAL OPTICS SET DEMONSTRATION LENSES

Each set includes six lenses in each of the primary configurations: double-convex, plano-convex, double-concave, plano-concave, concave-convex and convex-concave. These sets are ideal for teaching and demonstrating the basic principles of optics. Available in either 38mm (1½″ approx.) or 50mm (2″ approx.) diameter. Set includes:

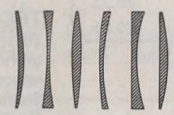
Description	Focal Length	Diopters
Double-Convex	+167mm	+3/+3
Double-Concave	−167mm	−3/−3
Plano-Convex	+333mm	+3/0
Plano-Concave	−333mm	−3/0
Convex-Concave (Positive meniscus)	+500mm	+5/−3
Concave-Convex (Negative meniscus)	−500mm	−5/+3

38mm Dia. Set E35,891 $19.95
50mm Dia. Set E40,414 $19.95

PRISM DISCOVERY SET

Set allows you to perform Newton's basic dispersion of white light into the spectrum experiments. Includes five acrylic shatterproof prisms. 1″, 1.375″, 1.5″, 2.5″ and 3″ lengths. Ideal for hands-on classroom demonstration.

Prism Set E34,576 $14.95



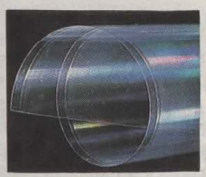
EDMUND'S FAMOUS 10-LENS KIT

Build a 4.4X Galilean telescope, a 12.4X astro telescope, a 3X double lens magnifier, 5X and 14X pocket magnifiers, a 40X microscope, a 35mm slide viewer and other optical instruments. Our famous 10-lens kit was one of our first products in the 1940's. Today, the lenses are all first grade industrial components rather than surplus war optics, but the fun and learning remain. Comes with 14-page instruction booklet.

10-Lens Kit E10,002 $23.50
2 or More, $22.50 Each

LEARN MORE ABOUT OPTICS

32-page "Fun With Optics" booklet. E9050 $4.95



ACETATE FILM DIFFRACTION GRATING

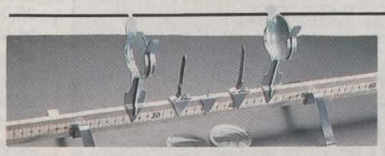
Diffraction grating has thousands of microscopic grooves per inch breaking up white light into all the colors of the spectrum. This phenomenon is called "diffraction." We offer film (acetate plastic) replicas at very low prices. It has 13,400 grooves per inch (lengthwise), 8½″ wide (7½″ grooved) × 0.005″ thick. Dispersion of the light is 24°.

A) Diffraction Grating In Sheets Or Rolls. Sheets and rolls of quality diffraction grating material for a wide variety of uses! All rolls and sheets measure 8½″ wide. Transmission type diffraction grating.

Size	8½″×11″ Sheet	6 Ft. Roll	24 Ft. Roll	100 Ft. Roll
Stock #	E40,267	E50,180	E70,565	E70,567
Price	$7.30	$17.35	$57.70	$164.90

B) Cardmounted Diffraction Viewers. Transmission-type grating film mounted in 2″×2″ cardboard slide mounts. Each has one square inch of diffraction grating exposed. Ideal for classroom demonstration or to mount in simple spectroscope.

Package of 25 Viewers E39,502 $19.95
Package of 80 Viewers E50,183 $49.95

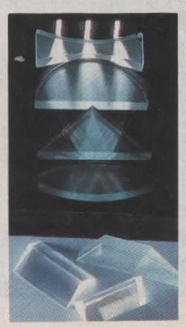


ECONOMICAL OPTICAL BENCH

Determine focal length of elements and perform basic optical design experiments. Both items below are needed for set-up.

A) Components: 2 end supports, 2 lens holders, (35mm to 50mm) diameter, 2 object markers, 1 card and 1 pin support. Fit on meter stick. E36,410 $9.95

B) Meter Stick: wooden meter stick with brass tips to hold components. E36,411 $2.95



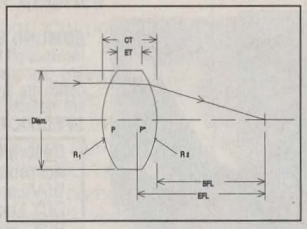
7 PIECE RAY BOX OPTICS SET

Set contains optical glass shapes with one matte surface so that light rays can be observed within the lens or prism when viewed from above. Ideal way to demonstrate the refraction and bending of light. Storage box acts as the ray box when used with any standard hi-intensity light source.

Ray Box Optics Set E37,824 $79.95

DOUBLE CONVEX LENSES (DCX)

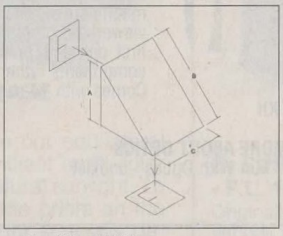
Double-Convex Lenses (DCX) are lenses which have two outward curving faces. Double-Convex Lenses have a positive focal length and will act as a magnifying or condensing lens.
Material: As Noted **Diameter:** ±0.1 mm
Focal Length: ±2% **Center Thickness:** ±0.2 mm
Edge Thickness: ±0.15 mm
Surface Quality: 80/50
Coating: 1/4 Wave MgF2, Broad Band AR
Bevel: 0.15 x 45°



Dia. (mm)	Effective Focal L.	Back F.L.	Center Thick	Edge Thick	Number Uncoated	Price	Number Coated	Price
3.0	3.00	2.21	2.30	1.64	E32,023	$14.20	E31,858	$14.75
3.0	4.50	3.78	2.00	1.47	E32,022	12.35	E31,859	12.90
6.0	6.00	5.19	2.54	1.29	E32,021	12.10	E31,860	12.65
6.0	9.00	8.22	2.25	1.22	E32,020	12.10	E31,861	12.65
6.0	24.00	23.13	2.60	2.23	E32,867	12.10	E32,868	12.65
9.0	9.00	7.90	3.45	1.60	E32,018	12.10	E32,019	12.65
9.0	13.50	12.56	2.75	1.20	E32,016	12.10	E32,017	12.65
12.0	12.00	10.79	3.85	1.40	E32,014	12.65	E32,015	13.15
12.0	18.00	16.81	3.48	1.43	E32,012	12.65	E32,013	13.15
12.0	24.00	22.65	4.00	2.50	E32,900	12.65	E32,901	13.15
12.0	36.00	34.90	3.30	2.31	E32,869	12.65	E32,870	13.15
12.0	72.00	71.07	2.80	2.31	E32,871	12.65	E32,872	13.15
15.0	30.00	28.82	4.00	2.13	E32,705	12.90	E32,706	13.65
18.0	27.00	25.25	5.50	2.42	E32,707	12.90	E32,708	13.65
18.0	36.00	34.59	4.80	2.55	E32,709	12.90	E32,710	13.65
20.0	40.00	38.44	5.30	2.80	E32,711	13.15	E32,712	13.95
25.0	25.00	22.47	8.00	2.90	E32,489	15.00	E32,490	15.75
25.0	50.00	48.29	5.00	1.90	E32,624	14.45	E32,625	15.25
25.0	75.00	73.84	3.50	1.40	E32,626	14.20	E32,627	15.00
25.0	100.00	98.95	4.00	2.48	E32,717	14.20	E32,718	15.00
25.0	125.00	123.84	3.50	2.28	E32,873	14.20	E32,874	15.00
25.0	150.00	148.88	3.40	2.39	E32,875	14.20	E32,876	15.00
25.0	175.00	173.94	3.20	2.33	E32,877	14.20	E32,878	15.00
25.0	200.00	198.35	5.00	4.25	E32,902	14.20	E32,903	15.00
25.0	400.00	398.36	5.00	4.63	E32,904	14.20	E32,905	15.00
35.0	70.00	67.48	7.50	3.12	E32,879	15.75	E32,880	17.35
40.0	80.00	77.33	8.00	4.63	E32,906	18.15	E32,907	20.25
40.0	100.00	97.34	8.00	4.09	E32,908	18.15	E32,909	20.25
40.0	200.00	197.36	8.00	6.07	E32,910	18.15	E32,911	20.25

TECHNICAL SPEC RIGHT ANGLE PRISMS

Right angle prisms are used to achieve a 90° light path bend. Images viewed through a single right angle prism will be erect but reversed left to right. While the relative positions of the top and bottom of the image will be the same, the right and left sides will be interchanged. The drawing shows a right angle prism and how the image is reversed as to left and right. Two right angle prisms can be used together as image erection or periscope systems. The simplified diagram illustrates our specification system for right angle prisms. All dimensions shown are in mm. Unless otherwise specified, the right angle prisms listed below are not aluminized.



Material: As Noted
Dimensional Tolerance: +0, -.1 mm.
Angle Tolerance: ±5' Arc Minutes
Bevel: .3mm x 45°.
Surface Quality: 60/40.
Surface Flatness: 2 Waves.
Coating: Hypotenuse is aluminized overcoated with inconel & black paint.

Size (mm) B	Size (mm) C	Size (mm) A	Tolerance	Number Uncoated	Price	Number Aluminized	Price
2.8	2.0	2.0	5'	E32,525	$60.40	E32,526	$63.55
7.0	5.0	5.0	5'	E32,328	20.50	E32,329	22.85
14.0	10.0	10.0	5'	E32,330	19.20	E32,331	21.80
21.0	15.0	15.0	5'	E32,332	19.70	E32,333	22.05
28.0	20.0	20.0	5'	E32,334	27.05	E32,335	30.20
35.0	25.0	25.0	5'	E32,336	30.20	E32,337	33.35
42.0	30.0	30.0	5'	E32,527	54.10	E32,528	48.35
50.0	35.0	35.0	5'	E32,529	51.50	E32,530	57.75
56.5	40.0	40.0	5'	E32,531	67.75	E32,532	74.05
63.5	45.0	45.0	5'	E32,533	78.50	E32,534	85.05
70.5	50.0	50.0	5'	E32,535	95.05	E32,536	102.40

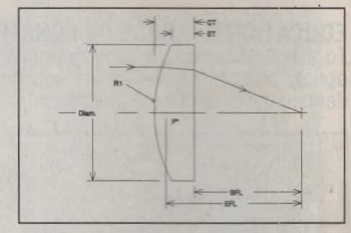
ES BARGAIN SURPLUS LENS KITS FOR THE EXPERIMENTER OR OPTICAL STUDENT

If you are an experimenter or an educator, our surplus lens kits are a true bargain. Each kit contains an assortment of real glass optics, negative and positive lenses, DCX, PCX, DCV, PCV, etc. Each is identified and the larger kits do not repeat the same lenses; (ie.) the 20 lens kit contains all of the 10 lens kit plus 10 more unique lenses. We cannot promise special lenses or specifications but we do promise that this is one of the last great bargains in optics.

10 Lens Kit E39,631 $10.00 **20 Lens Kit E39,632 $18.00**
30 Lens Kit E39,633 $25.00

PLANO-CONVEX LENSES (PCX)

Plano-Convex Lenses (PCX) have one flat and one outward curving face and positive focal length. They can magnify or condense.
Material: As Noted
Diameter: ±0.1 mm **Focal Length:** ±2%
Center Thickness: ±0.2 mm
Edge Thickness: ±0.15 mm
Surface Quality: 60/40
Coating: 1/4 Wave MgF2, Broad Band AR
Bevel: 0.15 x 45°



Dia. (mm)	Effective Focal L.	Back F.L.	Center Thick	Edge Thick	Number Uncoated	Price	Number Coated	Price
6.0	9.0	7.95	1.75	0.95	E32,469	10.40	E32,470	10.95
6.0	12.0	10.94	1.60	0.83	E32,471	10.40	E32,472	10.95
6.0	18.0	17.07	1.40	0.90	E32,473	10.40	E32,474	10.95
6.0	36.0	34.95	1.60	1.36	E32,848	10.40	E32,849	10.95
6.0	72.0	70.97	1.60	1.48	E32,850	10.40	E32,851	10.95
9.0	13.5	11.94	2.60	1.40	E32,009	10.40	E32,010	10.95
9.0	18.0	16.41	2.41	1.26	E32,008	10.40	E31,854	10.95
12.0	18.0	16.21	3.00	1.41	E32,006	10.95	E32,007	11.45
12.0	24.0	22.15	2.80	1.25	E32,011	10.95	E31,855	11.45
12.0	36.0	34.04	3.00	2.02	E32,933	10.95	E32,887	11.45
12.0	48.0	46.36	2.50	1.76	E32,852	10.95	E32,853	11.45
12.0	60.0	58.37	2.50	1.91	E32,854	10.95	E32,855	11.45
12.0	84.0	82.39	2.50	2.08	E32,856	10.95	E32,857	11.45
15.0	22.5	20.50	3.35	1.36	E32,004	12.35	E32,005	12.90
15.0	30.0	27.90	3.18	1.23	E32,003	12.35	E31,856	12.90
18.0	27.0	24.73	3.80	1.42	E32,001	12.35	E32,002	12.90
18.0	36.0	33.65	3.57	1.26	E32,000	12.35	E31,857	12.90
18.0	72.0	70.05	3.00	1.90	E32,859	12.35	E32,860	12.90
20.0	100.0	97.13	4.30	3.32	E32,475	13.15	E32,476	13.65
25.0	50.0	46.75	4.90	1.68	E32,477	13.40	E32,478	14.20
25.0	75.0	72.00	4.50	2.43	E32,479	13.40	E32,480	14.20
25.0	100.0	97.13	4.30	2.77	E32,481	13.40	E32,482	14.20
25.0	125.0	122.70	3.50	2.28	E32,861	13.40	E32,862	14.20
25.0	150.1	147.81	3.50	2.49	E32,863	13.40	E32,864	14.20
25.0	175.1	172.85	3.50	2.63	E32,865	13.40	E32,866	14.20
25.0	200.0	183.76	3.21	2.46	E32,890	13.40	E32,891	14.20
25.0	400.0	398.73	3.20	2.83	E32,892	13.40	E32,893	14.20
30.0	50.0	46.17	6.35	2.82	E32,483	14.20	E32,484	15.25
30.0	75.0	70.95	6.10	3.08	E32,485	14.20	E32,486	15.25
30.0	100.0	96.01	6.00	3.78	E32,487	14.20	E32,488	15.25
40.0	80.0	74.78	8.00	2.91	E32,894	16.30	E32,895	18.40
40.0	100.0	95.45	7.00	3.02	E32,896	16.30	E32,897	18.40
40.0	200.0	196.92	5.00	3.07	E32,898	16.30	E32,899	18.40

TECHNICAL SPEC ACHROMATIC LENSES

Two optical components, cemented to form an achromat. The two components are of different densities and therefore tend to correct chromatic and image aberrations that can occur because of the diffraction effects of a single type and piece of glass.
Surface Quality: 80/50
Coating: 1/4 Wave MgF_2 Broad Band AR.
Bevel: .2mm x 45°.
Material: As Noted.
Diameter: + .0, -.1mm.
Focal Length: 2%
Center Thickness: ±.4mm.

DIA (mm)	EFL	BACK FL	CT1	CT2	ET	Number Uncoated	Price	Number Coated	Price
6.25	12.50	10.36	3.00	0.80	3.12	E32,298	29.70	E32,299	30.75
6.25	15.00	13.18	2.70	0.60	2.65	E32,300	29.70	E32,301	30.75
6.25	20.00	18.23	2.70	0.90	3.00	E32,302	29.70	E32,303	30.75
6.25	25.00	23.45	2.30	0.90	2.73	E32,304	29.70	E32,305	30.75
6.25	35.00	33.59	2.30	0.90	2.86	E32,306	29.70	E32,307	30.75
12.50	20.00	16.45	5.25	1.10	4.62	E32,308	30.20	E32,309	31.80
12.50	25.00	21.47	5.00	1.25	3.59	E32,310	30.20	E32,311	31.80
12.50	30.00	26.88	4.50	1.20	3.12	E32,312	29.15	E32,313	30.75
12.50	40.00	37.54	3.73	1.33	3.88	E32,314	29.15	E32,315	30.75
12.50	50.00	47.61	3.50	1.50	4.06	E32,316	29.15	E32,317	30.75
12.50	75.00	72.35	3.00	1.60	4.00	E32,881	29.15	E32,882	30.75
15.00	30.00	25.78	6.00	1.50	5.88	E32,719	29.15	E32,720	30.75
18.00	50.00	45.88	5.00	2.30	5.69	E32,912	29.15	E32,913	30.75
18.00	80.00	76.52	5.00	2.50	6.27	E32,914	29.15	E32,915	30.75
20.00	40.00	34.38	8.00	2.00	7.83	E32,721	30.20	E32,722	31.80
25.00	35.00	27.55	11.00	2.50	9.47	E32,318	34.15	E32,319	35.75
25.00	40.00	33.26	9.50	2.50	8.54	E32,320	34.15	E32,321	35.75
25.00	50.00	43.53	9.00	2.50	8.79	E32,322	32.55	E32,323	34.15
25.00	60.00	53.77	9.00	2.40	8.81	E32,723	32.55	E32,724	34.15
25.00	75.00	70.39	7.00	2.50	6.97	E32,324	32.55	E32,325	34.15
25.00	100.00	95.92	6.00	2.50	6.61	E32,326	32.55	E32,327	34.15
25.00	125.00	120.89	6.00	2.40	6.90	E32,491	32.55	E32,492	34.15
25.00	150.00	146.10	5.70	2.20	6.60	E32,493	32.55	E32,494	34.15
25.00	175.00	170.84	6.00	3.00	7.90	E32,883	32.55	E32,884	34.15
25.00	200.00	194.14	8.50	4.00	11.56	E32,916	32.55	E32,917	34.15
25.00	250.00	246.63	5.00	2.50	6.75	E32,918	32.55	E32,919	34.15
30.00	50.00	42.57	11.00	2.20	9.20	E32,495	36.50	E32,496	38.10
30.00	75.00	68.92	8.40	3.00	8.40	E32,497	36.50	E32,498	38.10
30.00	100.00	94.54	8.25	2.80	8.30	E32,499	34.40	E32,500	36.00
30.00	150.00	144.63	8.10	2.60	8.88	E32,501	34.40	E32,502	36.00
40.00	120.00	112.27	9.60	4.20	10.51	E32,920	63.05	E32,921	68.25
40.00	160.00	154.10	8.50	4.00	9.48	E32,922	63.05	E32,923	68.25
40.00	200.00	194.14	8.50	4.00	10.09	E32,924	63.05	E32,925	68.25
40.00	400.00	349.33	8.50	4.00	11.30	E32,926	63.05	E32,927	68.25
50.00	150.00	143.17	9.50	4.00	8.93	E32,885	73.55	E32,886	84.05

FRESNEL LENSES

A Fresnel lens is a flat, thin piece of acetate butyrate in which are molded a series of small concentric stepped zones. They extend from center to outer margins. Each groove is a minute refracting facet capable of bending light apart. Its transmittance (ability to pass light) is greatly increased over that of a conventional lens of the same focal length. These lines are only a few thousandths of an inch. Each concentric line acts as a part of a lens. Taken all together they form the function of a true lens. Some Fresnels can be used as a magnifier but they will cause eye strain if used for extended reading. As a solar collector they are extremely powerful and can ignite flammable materials in seconds. They must be used with caution around sunlight. Fresnels are also used as an image and light concentrator in overhead projectors. We offer both Tech Spec grade and experimental grade.

SPECIFICATIONS:
Refractive Index: 1.49 **Maximum Service Temperature:** 176°F
Transmission: 92% from 400-700nm (visible spectrum)
Tolerances: F.L. ±5%, thickness ±40% All dimensions are in inches.

Commercial Grade Fresnels Best Grade- Unlimited Stock

Number	Price	Approx. Size	Effective Size	F.L. Inches	Thick. Inches	Lines Per Inch
E43,010	$13.50	1.7x1.7	1.5	3.0	.05	80
E32,588	13.50	1.5x1.5	1.0	1.0	.05	100
E32,587	13.50	2.0x2.0	1.3	.85	.05	200
E32,589	13.50	2.3x2.3	2.0	1.3	.05	125
E32,681	19.50	2.5x2.5	2.5x2.5	5.0	.05	125
E43,011	15.50	3.0x3.0	2.5	3.3	.05	125
E43,012	15.50	3.0x3.0	2.5	3.6	.05	125
E32,590	15.50	3.0x3.0	2.5	2.6	.05	125
E32,591	15.50	3.0x3.0	2.5	3.0	.05	125
E32,592	15.50	3.0x3.0	2.5	3.9	.05	125
E32,682	19.75	3.0x3.0	2.5	7.9	.05	25
E32,683	19.75	5.0x5.0	4.0	2.8	.11	100
E32,684	24.75	5.0x5.0	4.0	5.0	.11	125
E43,013	36.75	5.5	5.0	10.0	.11	100
E32,593	36.75	6.7x6.7	6.0	3.0	.11	100
E32,594	36.75	6.7x6.7	6.0	6.0	.11	125
E32,685	36.75	6.7x6.7	6.0	10.0	.11	100
E32,686	36.75	6.7x6.7	6.0	12.0	.11	50
E43,014	46.75	7.5	7.0	16.0	.11	300
E43,015	46.75	8.5x10.5	8.0x10.5	18.0	.11	200
E43,016	46.75	10.4	10.0	17.0	.11	200
E43,017	46.75	10.4	10.0	19.5	.11	50
E32,595	46.75	10.4	10.0	8.0	.11	200
E32,596	46.75	10.4	10.0	12.5	.11	120
E43,018	46.75	11.0x11.0	10.5x10.5	13.8	.11	50
E43,019	46.75	11.0x11.0	10.5x10.5	18.0	.11	50
E32,687	46.75	11.0x11.0	10.5x10.5	7.0	.11	50
E32,597	46.75	11.0x11.0	10.5x10.5	8.2	.11	50
E32,598	46.75	11.0x11.0	10.5x10.5	9.2	.11	50
E32,689	46.75	11.0x11.0	10.5x10.5	16.5	.11	50
E32,690	46.75	11.0x11.0	10.5x10.5	19.0	.11	50
E32,691	46.75	11.0x11.0	10.5x10.5	24.0	.11	200
E43,020	95.75	14.0	12.9	24.0	.11	200

EXPERIMENTAL GRADE FRESNELS

E30,389*	$13.65	2-1/8x2-1/4		3	1/16	215
E31,553***	31.25	11-1/4 Sq.		8-1/2	1/16	100
E40,954	27.05	6 Sq.		10	3/32	110
E61,191****	15.50	6-9/10x9-1/4		12-1/2	1/16	120
E72,529***	23.90	10-13/16 Sq.		8-1/2	5/32	50
E71,316***	32.30	11-1/8 Sq		5-1/2	5/32	50
E70,877	22.90	11-1/4 Sq.		16	3/32	50
E60,500	52.50	11-1/2x16-1/8		24-1/2	3/32	50
E72,062	26.00	15-1/2 Dia.		11-1/2	5/64	50
E70,716	82.70	16-1/2x21-1/8		24	1/8	50
E70,717	102.90	19x24-3/4		24	1/8	50
E34,747	131.25	28-1/2x37-1/4		54	3/16	40
E31,139	158.05	31-1/2x41		40	3/16	40
E70,533	27.85	10-1/2 Sq.		8-1/2	1/16	50

* w/10mm dia. hole
*** Cemented double lenses **** Frosted

BENCH ACCESSORIES:

T-SLOT BENCH BEAM

Clear anodized aluminum extrusion with T-slot on exterior faces, stabilizing support feet and 1000mm scale. Dimensions: 1 meter L x 28mm Square. **E39,511 $46.95**

LIGHT SOURCE

90mmL x 50mmH x 50mmW black steel housing with slot to accept 50mm x 50mm (2" x 2") slides on face of housing. 12V 15W linear filament lamp, DIN type power input plug, includes 12V, 1.3A wall plug-in transformer with 6' cord.
E39,512 $89.95
Repl. Bulb E39,513 $3.95

COMPONENT CARRIER

Magnetic stainless steel component carrier accepts 50mm Dia. lens or 50mm square slide. 45mm Dia. clear aperture center hole, overall height 120mm. Includes all mounting hardware. **E39,514 $24.95**

PRISM HOLDER/ADAPTER

Holder attaches to front face of the above component carrier to accept prisms, cube beam splitters, etc. Up to 31mm (1.25") Thick. A nylon thumbscrew secures the prism's position on the shelf. Made of magnetic stainless steel. **E39,515 $11.95**

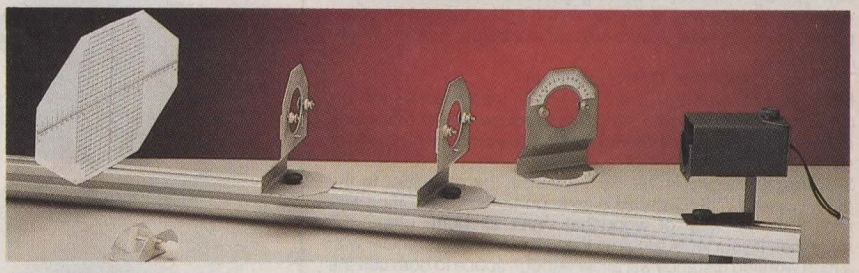
TARGET SCREEN

Lexan target screen with X-Ymm cross scales and 140mm x 140mm grid pattern in 5mm squares.
X Scale: 300mm Long in 1mm incre.
Y Scale: 140mm Long in 1mm incre.
Overall dimensions: 335mmL x 150mmH with L bend to mount directly to bench. Mounting hardware included. **E39,516 $16.95**

PRECISION IRIS DIAPHRAGMS

• From Germany, England and Japan • Exceptionally Smooth Operations • For Large Volume Applications
Continuing supply of fine quality iris diaphragms designed for instrument use. Lever-operated iris leaves made of blued spring steel in lightweight brass or aluminum mounts. Exceptionally smooth operation. Iris diaphragms are used in photography to control or vary the f-ratio of an optical system. On the optical bench they are used to reduce beam diameter while keeping the energy level constant. Edge mounted levers are either plastic "tab" type or steel "pin" type (see comments). Lever travel from maximum to minimum aperture is approximately 90°.

Number	Price	Outer Dia. (a)	Aper. Max. (b)	Aper. Min. (c)	Thick-ness (d)	Comments
E32,623	29.75	14.8	8.0	0.7	4.5	Housing Brass, Lever Steel,Pin, 7mmL x 1.5mmDia. 8 blades
E42,124	29.75	15.0	8.5	1.0	5.0	Housing Brass, Lever Plastic Tab, 8mmL x 2mmW 9 blades
E30,263	28.75	19.5	12.0	1.0	5.0	Housing Brass, Lever Steel,Pin, 11.5mmL x 3mmDia. 10 blades
E42,123	29.85	22.0	14.0	1.0	5.5	Housing Brass, Lever Plastic Tab, 12mmL x 4mmDia. 10 blades
E32,622	28.75	24.0	15.0	0.8	5.0	Housing Brass, Lever Steel Pin, 12mmL x 3mmDia. 12 blades
E32,621	28.75	27.0	18.0	0.8	5.0	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 12 blades
E35,111	36.75	30.0	15.0	1.5	6.0	Housing Aluminum, Lever Brass Pin, 4mmL x 2mmDia. 12 blades
E36,623	34.50	31.0	18.0	1.2	6.5	Housing Aluminum, Lever Plastic Tab, 10mmL x 5mmW 11 blades
E32,620	29.75	33.0	22.0	0.8	5.5	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 14 blades
E35,110	35.50	37.0	20.0	1.5	8.0	Housing Aluminum, Lever Brass Pin, 3.5mmL x 2mmDia.10 blades
E42,122	39.50	40.0	28.0	1.2	5.5	Housing Brass, Lever Steel Pin, 11mm L x 3mmDia. 16 blades
E40,997	37.00	42.0	25.0	1.0	7.0	Housing Brass, Lever Brass Tab, 21mmL x 5mmW 10 blades, Swing-out filter holder for 32mm dia. filter. Threaded mounting ring 28mmDia. thread .5mm
E40,998	37.50	48.0	30.0	1.0	12.5	Housing Brass, Lever Brass Tab, 20mmL x 5mmW. 12 blades. Swing-out filter holder for 33mmDia. filter threaded mount 34mmDia.Thread .5mm
E41,972	41.25	49.0	34.0	1.0	6.5	Housing Brass, Lever Steel Pin, 12mmL x 3mmDia. 14 blades
E42,121	37.50	48.5	30.0	1.2	7.5	Housing Aluminum, Lever Steel Pin, 15mmL x 3mmDia. 11 blades
E32,619	36.75	50.0	36.0	1.2	6.0	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 16 blades
E35,109	57.75	52.0	33.0	2.0	5.5	Housing Aluminum, Lever Steel Pin, 2mmL x 2mmDia. 14 blades
E32,618	33.75	53.0	37.0	1.2	6.0	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 16 blades
E41,973	42.75	55.0	41.0	1.2	6.5	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 18 blades
E30,118	40.75	58.0	42.0	2.0	6.5	Housing Brass, Lever Steel Pin, 13mmL x 3mmDia. 18 blades
E36,624	79.75	60.0	40.0	2.5	7.8	Housing Aluminum, Lever Plastic Tab, 13mmL x 7mmW 12 blades
E32,617	69.00	70.0	50.0	2.0	7.5	Housing Brass, Lever Steel Pin, 16mmL x 3mmDia. 16 blades
E32,616	70.00	77.0	59.0	7.0	8.0	Housing Brass, Lever Steel Pin, 15mmL x 3mmDia. 20 blades
E32,615	71.00	80.0	58.0	3.0	8.0	Housing Brass, Lever Steel Pin, 15mmL x 3mmDia. 18 blades
E36,625	79.75	82.0	60.0	4.0	10.1	Housing Aluminum, Lever Plastic Tab, 10mmL x 8mmW 17 blades
E32,614	105.75	92.0	70.0	4.5	9.0	Housing Aluminum, Lever Steel Pin, 14mmL x 3mmDia. 20 blades
E30,264	125.75	100.0	75.0	7.0	9.0	Housing Aluminum, Lever Steel Pin, 9mmL x 3mmDia. 19 blades
E32,613	145.75	110.0	80.5	4.5	10.0	Housing Aluminum, Lever Steel Pin, 14mmL x 3mmDia. 16 blades
E32,612	160.75	120.0	90.0	5.0	12.0	Housing Aluminum, Lever Steel Pin,15mmL x 3mmDia. 20 blades
E32,611	185.50	130.0	98.0	5.0	12.0	Housing Aluminum, Lever Steel Pin, 21mmL x 3mmDia. 20 blades
E32,610	195.75	140.0	104.0	13.0	11.0	Housing Aluminum, Lever Steel Pin, 11mmL x 3mmDia. 16 blades
E60,644	195.75	150.0	110.0	5.0	13.0	Housing Aluminum, Lever Steel Pin, 22mmL x 3mmDia. 20 blades
E32,609	205.75	165.0	120.0	6.0	15.0	Housing Aluminum, Lever Steel Pin, 20mmL x 3mmDia. 18 blades
E32,608	250.75	180.0	138.0	10.0	13.0	Housing Aluminum, Lever Steel Pin, 19mmL x 3mmDia. 20 blades



THE EDMUND STUDENT OPTICAL BENCH

We spoke with teachers to determine their needs, then built and demonstrated early experimental benches to obtain their reactions and suggestions. From this background emerged the **Edmund Student Optical Bench**. It fills a critical gap between the meter stick and professional optical benches. We are proud to present what we believe to be the finest bench of its kind. You will find it to be a high quality, versatile, affordable and effective teaching aid, another **Edmund** product directed toward helping America and other countries improve the quality of education for a better world. Teachers will find it convenient for demonstrations. Student teams can get practical hands-on experience and get right down to the heart of an experiment without fussing and improvising.

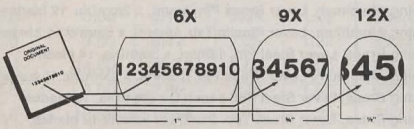
The Basic Kit Includes:
- An extruded aluminum, clear anodized multi T-Slot meter beam with stabilizing support and a full 1000mm scale
- A Lamphouse with a bright, long life, linear filament 1142 bulb, socket and DIN connector
- A 12V, 1.3A wall plug-in Transformer w/DIN connector, UL approved
- Two versatile magnetic stainless steel Carriers to accomodate a 50mm diameter lens and/or a 50mm square slide or your improvised magnetic component
- A 6" high x 12" wide Lexan Screen with combined X-Ymm scales and 5mm grid pattern
- Assorted 50mm diameter lenses and mirrors and 50mm square slides including filters,diffraction gratings, polarizers, slotted and round aperture plates, diffuser and a crossed arrows object slide, all contained in a handy compact case
- An expandable Optics Experiment Outline series available in loose leaf note form

We offer all this as a Single Kit (A $248.25 Value) E39,510 $225.00

Edmund Graphic Arts Comparators

THE EDMUND PRE-COP-TIC ACHROMATIC MAGNIFIERS WE HAVE LISTED ON THE FOLLOWING PAGES ARE THE FINEST MADE . . . EACH GIVES A LARGE FLAT FIELD WITH CRYSTAL CLEAR DEFINITION

Ideal for close up examinations. Engineered to the highest optical standards in our Barrington plant. Each provides a clear and sharp image right to the edge of the wide flat field. Achromatic color-corrected, three-element lens system assures you of top performance every time. Protective gaskets seal both the top and bottom of each lens cell to keep internal surface free of dust and moisture. Each is pre-tested at the factory and guaranteed against defects in materials and workmanship. Here's an example of the magnification power at:



THREE MAGNIFICATIONS AVAILABLE

There is a Pre-Cop-Tic achromatic magnifier to meet your exacting magnification requirement. The illustration above demonstrates the difference between 6X, 9X and 12X. Four of our Pre-Cop-Tic achromatic magnifiers are available in 6X, 9X or 12X; magnifier #42,769 is available in 6X.

BUYER'S/OWNER'S GUIDE TO MAGNIFIERS

Magnifiers have many applications for industrial production line inspection, reading small scales, examining surfaces and the like. They are also important to hobbyists and invaluable appraisal and authentication aids to collectors. In schools, magnifiers help to explain many scientific and natural phenomena.

The Perfect Magnifier . . . An Impractical Dream

A perfect magnifier would be lightweight, have a large diameter, provide a wide viewing area and offer high, distortion-free magnification. However, incorporating all of these features into one unit is optically impossible. The magnifiying power of a lens depends on its focal length (f.l.). The focal length, in turn, depends on the lens curvature; the greater the curvature, the shorter the focal length and the greater the power. In the design of a simple, inexpensive magnifier, the lens diameter will typically decrease as the curvature increases to provide higher power. Conversely, as the curvature is decreased to lower the power, the diameter generally increases with a resulting increase in viewing area. In addition, distortion generally increases with an increase in curvature. Thus, a magnifier with a large diameter typically offers more viewing area and less power. So, both wide field of view and high magnifying power cannot be incorporated into a single design without elaborate, weighty, high-cost lenses.

The Basic Magnifier Optical System

Number of Elements. The single lens is satisfactory for low powers. Higher powered magnifiers require two or more lens elements for improved resolution and correction of chromatic or other aberrations.

Working Distance is the distance from the magnifier to the object viewed. This distance is an important consideration with regard to the type of work that must be done under the magnifier. If your work requires the use of tools, a magnifier with a high working distance will allow enough space to both use the tools and comfortably view the object.

Small working distance magnifiers with higher power are preferred to close-up inspection work.

Eye Relief is the maximum distance the eye can be from the magnifier and still provide a full field of view. Longer eye reliefs generally provide more comfortable viewing.

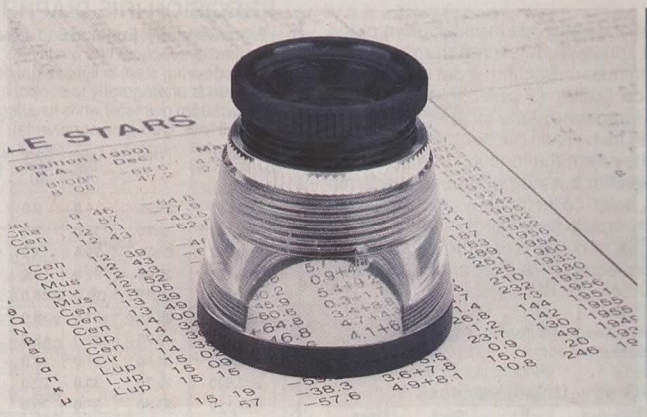
Field of View is the area seen through the magnifier. As power increases, lens diameter and field of view decrease. At 5 power (5X), field of view is about 1-1/2". At 10 power (10X), it is about 1/2". Usually, it is best to use low power for scanning surfaces and high power for checking small areas.

Depth of Field is the distance between the closest and farthest points at which a magnifier in a fixed position stays in focus. It is a valuable feature for examining uneven surfaces such as rock specimens. The depth of field decreases as power increases.

Coating. Lens surfaces coated with special anti-reflection coatings will reduce light loss and are particularly useful for low light level applications.

Magnifications. 10" is assumed to be as close as you can focus for comfortable vision. An object only 1" from your eye would be 10 times larger, but out of focus. A magnifier's function is to make this close view possible. Since a 1" focal length lens brings clear vision down to 1" from the eye, an object at this distance is clearly seen and appears to be 10 times larger than it does when viewed from 10" away. Such a magnifier is commonly called a 10X or 10 power.

Actual magnifying power will vary slightly, depending upon working distance, eye relief distance and the characteristics of the observer's eye.



TRANSPARENT BASE MAGNIFIER WITH CONTACT RETICLE ADAPTER RING

- **New & Improved Design**
- **Edmund Designed and Engineered**
- **For Editors And Proofreaders**
- **Clear Base Admits Light**
- **6X, 9X, 12X Available**
- **American-made**
- **High Power, Wide Field**

Excellent for determining paper quality and ink absorption. Ideal for proofreaders. The transparent acrylic base rests directly on work for clear, close-up examinations. Base admits light to subject under view. 12X and 9X are Kellner-type, color-corrected, three-element lens systems. 6X model has a precision single-element DCX lens. Twist focus with lock-ring for permanent setting. Contact reticle adapter ring on base accepts all 27mm diameter reticles. Since as power increases, field of view decreases, in the 12X model the full reticle pattern of some crowded reticles will not be visible. A genuine leather case, also U.S.-made, is available as an option.

SPECIFICATIONS:	6X	9X	12X
Eye Lens Diameter:	0.875"	0.680"	0.680"
Field of View:	1"	3/4"	5/8"
Working Distance:	1-1/4"	3/4"	1/2"
Lens System:	DCX-glass	Kellner-type AR coated	Kellner-type AR coated
Weight:	1.20 oz.	1.44 oz.	1.41 oz.
Height:	1-1/2	1-1/4"	1-1/4"
Item:	E30,020	E30,057	E30,055
Price:	$37.00	$39.00	$44.00
Genuine Leather Case	E36,286 $7.50		

Popular Special Application Magnifiers and Reticles

EDMUND 6X GRAPHIC ARTS COMPARATOR FOR TYPE, SPACING, SCREENS

- **New & Improved Design**
- **Edmund Designed & Engineered**

One linear scale measures to 48 points by 1/2 point increments. Another, 1/2" long, has 1/100" and 1/200" divisions. 12 scales measure halftones from 50 to 200 lpi. Also, 1/4, 1/2, 1, 1-1/2, 2, 3, 5 and 6 point blanks. Etched and filled glass contact reticle is 27mm diameter. Clear acrylic cell. Focusing threads with lock.

Eye Lens Diameter: 0.875"
Height: 1-1/2" **Weight:** 1.20 oz.
Field of View: 1" **Working Distance:** 1-1/4"
Lens System: DCX glass lens.

Comparator and Reticle	E30,551	$52.50
Comparator Only	E31,198	$37.00
Reticle Only	E30,539	$22.75
Leather Case	E36,286	$7.50

EDMUND 12X MAGNETIC INK COMPARATOR

- **New & Improved Design**
- **Edmund Designed & Engineered**

An important tool in magnetic ink printing field. Check character skew, width, coverage, voids against American Banking Association tolerances. Clear acrylic cell. Focusing threads with lock. 27mm contact reticle.

Eye Lens Diameter: 0.680"
Height: 1-1/4" ; **Weight:** 1.41 oz.
Field of View: 5/8" **Working Distance:** 1/2"
Lens System: Kellner-type with AR coating.

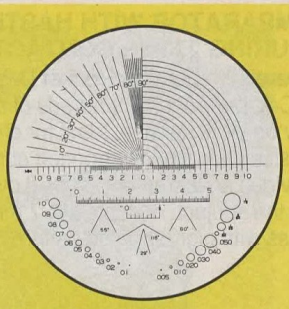
Comparator and Reticle	E30,285	$59.50
Comparator Only	E30,177	$44.00
Reticle Only	E30,284	$22.75
Leather Case	E36,286	$7.50

Note: When using other 27mm reticles with Comparator #30,177, only center portion of field (13mm diameter) is visible, due to higher magnification.

EDMUND'S 21 MM AND 27 MM CONTACT RETICLES

Glass etched reticles offer greater stability than a film reticle which can bend, warp and easily be damaged. Our reticles have pigment-filled markings and patterns for long use. Markings are on the outside of the reticle so the scales are always in direct contact with the object under view. This provides optimum focus and accurate measurements. 15 reticles to choose from for use with ES 6X, 9X, 12X comparators. However, while the reticles indicated with an asterisk may be used with our 12X, it is difficult to see the edge of the field. Reticles can easily be cleaned with our **Edmund Lens Tissue (#60,375)**.

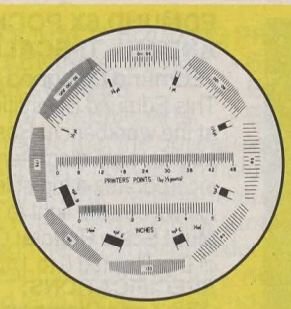
Reticles Each $22.75
2 or More, $20.75 Each



MULTI SCALE

27mm and 27mm available. 3 horizontal scales: 20mm 0 center scale (10-0-10) both sides calibrated 0 to 1 in 0.05mm, 1 to 5mm on 0.1mm and 5 to 10mm in 1/64" divisions. 90° angle scale in 5° divisions (0 to 80); and 1 divisions from 0.1 to 1.0mm; ten with 0.005" to q/64" dia. Angle scales 29°,55°,60°,118°.

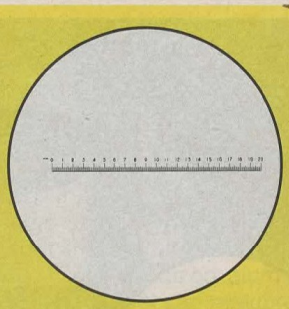
27mm E30,585
21mm E32,254



HALFTONE*

27mm available only.
6X comparator to 48 points by 1/2 point. 12 scales measure halftones from 50 to 200 lpi. 1/4, 1/2, 1, 1-1/2, 2, 3, 5 & 6 point blanks.

27mm E30,539

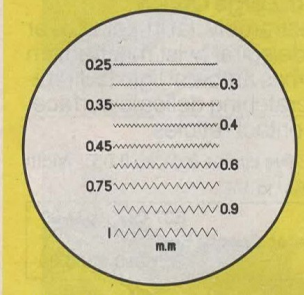


STRAIGHT LINE SCALE

27mm and 21mm available.
Metric 27mm dia. with 20mm scale in 200 parts; 21mm dia. with 15mm scale in 150 parts; graduated every 0.1mm number every 1mm. Inch 27mm dia. with 0.75" scale in 150 parts, graduated every 0.005". Inch 21mm dia. with 0.50" scale in 100 parts, graduated every 0.005".

Metric
27mm E30,323
21mm E32,255

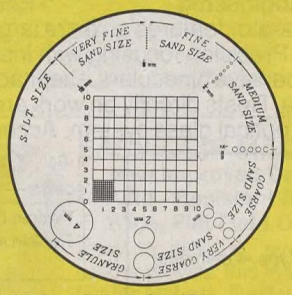
Inch
27mm E32,810
21mm E2,013



THREAD (MM)*

27mm available only.
9 metric screw threads — 0.25, 0.3, 0.35, 0.4, 0.45, 0.6, 0.75, 0.9, 1mm.

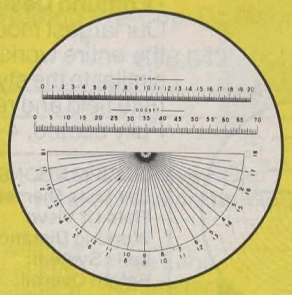
27mm E30,590



GEOLOGICAL SAND*

27mm available only.
10mm grid scale numbered every mm with 2mm grid rule in 0.2mm squares. 1/16, 1/8, 1/4, 1/2, 1, 2 and 4mm circles for grain size measurements.

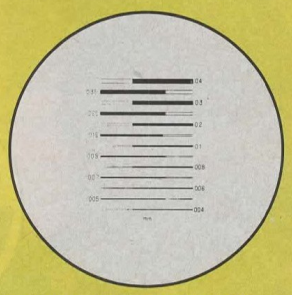
27mm E30,174



AERIAL PHOTO*

27mm available only.
20mm scale graduated 1/10mm, 0 to 20. Scale 0.07 ft., graduated 0.0005 ft. Compass rise calibrated each 5°, 0 to 18, left to right and right to left.

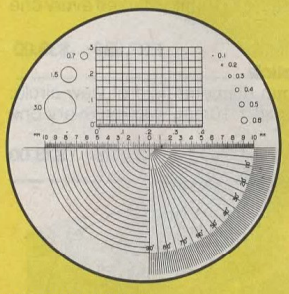
27mm E30,461



THICKNESS GAUGE (MM)

27mm and 21mm available.
13 line widths (mm). .04, .05, .06, .07, .08, .09, .1, 0.15, 0.2, 0.25, 0.3, 0.35, 0.4(mm).

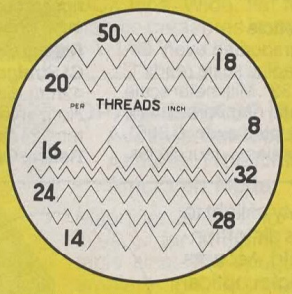
27mm E30,586
21mm E32,519



METRIC HOLE*

27mm available only.
0.3" x 0.4" grid in 0.025" squares. Two horizontal scales; 4" with 0.005" divisions; 20mm with 1/10mm divisions. Angle scale 0° to 90° in 1° divisions. Radius scale 1 to 10mm. Nine circles 1/10mm to 3mm dia.

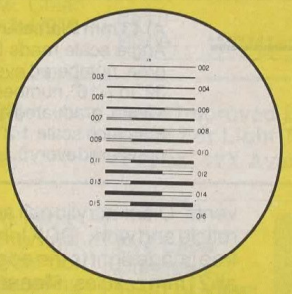
27mm E30,584



THREAD (IN.)*

27mm available only.
9"scew threads shown in TPI 50.32,28,20,24,18,14,8.

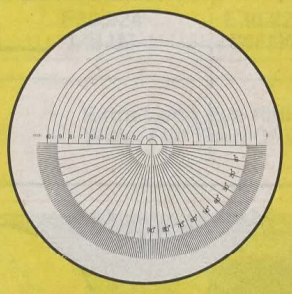
27mm E30,591



THICKNESS GAUGE (INCH)

27mm and 21mm available.
15 line widths in increments from 0.002 to 0.016"

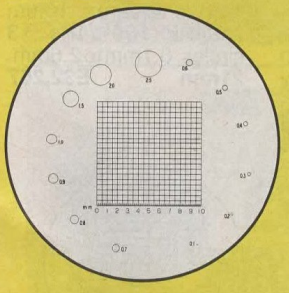
27mm E30,587
21mm E32,256



RADIUS SCALE

27mm available only.
10mm radius scale numbered each mm; graduated each 1/2mm; 180° protractor numbered each 10°, graduated each degree.

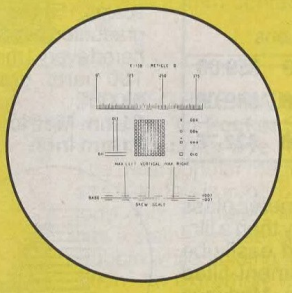
27mm E30,589



MM SQUARE*

27mm and 21mm available.
10mm square divided into 1/2mm squares. 10mm scale in 100 parts. 13 circles, 0.1mm to 2.5mm.

27mm E30,588
21mm E32,257



MAGNETIC INK

27mm available only.
Check character skew, width, coverage, voids against American Banking Association tolerances.

27mm E30,284

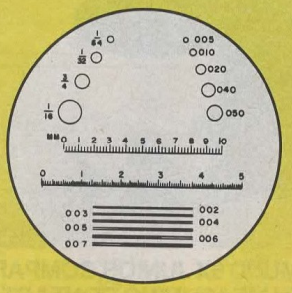
GLASS OCR*

27mm available only.
ANSI standard size 1 with character outline block. Indicates tolerances for inner and outer stroke borders.

27mm E30,642

ANSI Standard Size IV.

27mm E30,643



THICKNESS GAUGE

21mm available only. A series of parallel lines 0.002" to 0.007" apart measure thickness. 10mm metric scale is divided into units of 0.2mm; 0.5" decimal-inch scale divided into units of 0.005". Hole diameter scales read in fractions from 1/64" to 1/16" and decimals from 0.005" to 0.05".

21mm E30,186

EDMUND 6X POCKET COMPARATOR WITH HASTINGS TRIPLET LENS SYSTEM AND MULTI-SCALE MEASURING 27 mm CONTACT RETICLE

• Edmund Designed & Engineered • Leather Pocket Case

This Edmund Scientific Pocket Comparator has hundreds of applications in industry, the laboratory and at the workbench. Rests directly on work surface. Ideal for checking small parts, linear measurements, angles, hole diameters, thread sizes. Unlike lower priced comparators with only a simple lens, the 6X incorporates a triplet lens. It provides an extremely flat field over the entire reticle area. Clear acrylic cell allows outside light to illuminate the subject. Accepts all 27 mm reticles described within this section.

Multi Scale Reticle: Optical glass with pigment filled pattern. 20mm long 0 center (10-0-10), both sides of 0 calibrated 0 to 1mm.

SPECIFICATIONS:

Eye Lens Diameter:	0.925	**Height:**	1-3/4"
Weight:	43.3 grams	**Field Of View:**	1"
Working Distance:	1-1/2"	**Lens:**	Glass Hastings Triplet

Comparator and Reticle	**E41,055**	**$79.00**
Comparator Only	**E30,325**	**$67.00**
Reticle Only	**E30,585**	**$22.75**

EDMUND 7X WIDE FIELD COMPARATOR WITH FOUR ELEMENT COATED ERFLE LENS SYSTEM

• Edmund Designed & Engineered • Extra Wide Field, Large Optics

Our largest model comparator features an extra large field with extremely flat imaging over the entire working area. Precision focusing with instrument grade spiral twist mechanism similar to the style on expensive binoculars. Clear acrylic cell permits ambient light to illuminate field and reticle area. Rests directly on work area without scratching delicate surface. Fully coated, 4-element optical glass system. Accepts 43 mm contact reticles.

SPECIFICATIONS:

Eye Lens Diameter:	1-3/16"		
Field Of View:	1-1/4"		
Working Distance:	7/8"		
Lens System:	Erfle Type, 4 elements		
Height Overall:	2-1/4"		
Diameter:	2"	**Weight:**	5.5 oz.

7X WF Comparator **E37,696 $145.00**

OPTICAL GLASS RETICLES 43 mm DIA.

A) 43 mm Diameter, 6 Scale Reticle

Angle scale reads 0° to 90°, graduated every degree, numbered every 10°. Radius scale reads 1/32" to 7/16", numbered every 1/32". Millimeter scale 10mm, graduated every 1/10mm, numbered every mm. Inch scale 1/2" long, graduated every 0.005", numbered every 0.100". Circle scales — four circles, 1/64", 1/32", 3/64", 1/16", five circles 0.01" to 0.05". Width scales — seven sizes, 1/64" to 1/4".

Reticle Only	**E37,697**	**$33.00**
Reticle and 7X Comparator Special Set	**E37,698**	**$165.00**

B) Cross Line Scale Reticle

43mm diameter with 26mm diameter field of view circle. Vertical scale above center line, zero to 0.4" in 4/10" divisions. Two scales below center line, zero to 0.1" in 0.01" divisions and 0.1" in 4/10" divisions. Horizontal line, 24mm long. Three scales left of center line, 1/10mm, 2/10mm and 5/10mm, numbered every one mm. 12mm long. One scale right of center line graduated in 5/10mm, marked every one mm. 12mm long.

Reticle Only **E37,699 $33.00**

C) Straignt Line Scale Reticle

43mm diameter with 26mm diameter field of view circle. Horizontal line graduated in 1/10mm, marked every one mm. 24mm long.

Reticle Only **E37,700 $33.00**

EDMUND 6X JUNIOR COMPARATOR WITH MEASURING CONTACT RETICLE

• Edmund Designed & Engineered
• Leather Pocket Case

The Edmund Scientific Junior Comparator is easy to carry in your pocket or tool chest; it's only 1-3/4" high x 1" O.D. It has an etched glass reticle instead of a film reticle found on many other pocket comparators. This insures stability since glass will not bend or warp and is not damaged by oils or solvents. Clear acrylic cell admits plenty of light to reticle and work. DCX lens provides distortion-free image right to the edge of the field. Accepts all 21mm reticles. **Measuring Reticle:** optical glass with pigment filled pattern. 0.002" to 0.007" parallel lines, linear 0.2mm and 0.5".

SPECIFICATIONS:

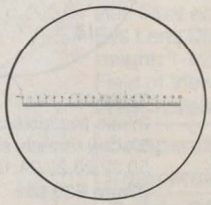
Eye Lens Diameter:	0.630"		
Height:	1-3/4"	**Weight:**	16.6 grams
Field Of View:	3/4"		
Working Distance:	1-3/4"		
Lens System:	DCX Glass Lens		

Comparator And Reticle	**E30,169**	**$59.00**
Comparator Only	**E31,608**	**$49.00**
Reticle Only	**E30,186**	**$22.75**

OPTIONAL RETICLES

Edmund's 21mm and 27mm diameter glass etched reticles offer greater stability than a film reticle which can bend, warp and easily be damaged. Our reticles have pigment-filled markings and patterns for long use. Markings are on the outside of the reticle so the scales are always in direct contact with the object under view. This provides optimum focus and accurate measurements. Reticles can easily be cleaned with our Edmund Lens Tissue (#60,375).

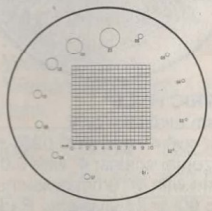
Reticles Each $22.75
2 Or More, Each $20.75



STRAIGHT LINE SCALE

21mm diameter in metric or inch scales. 15mm scale in 150 parts; graduated every 0.1mm, numbered every 1mm. 0.50" scale in 100 parts, graduated every 0.005".

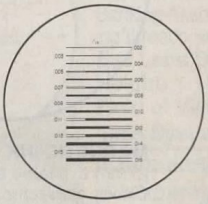
21mm Metric E32,255
21mm Inch E2,013



MM SQUARE

10mm square divided into 1/2mm squares. 10mm scale in 100 parts. 13 circles, 0.1mm to 2.5mm.

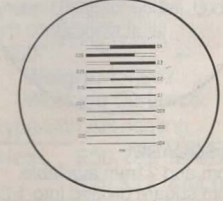
21mm E32,257



THICKNESS GAUGE (IN.)

15 line widths in increments from 0.002 to 0.016".

21mm E32,256



THICKNESS GAUGE (mm)

13 line widths (mm). .04, .05, .06, .07, .08, .09, 0.1, 0.15, 0.2, 0.25, 0.3, 0.35, 0.4mm.

21mm E32,519

12X COMPACT FOLDING PRE-COP-TIC MAGNIFIER

- **New Advanced Design**
- **Extra-Long Eye Relief**
- **American-Made**
- **Edmund Designed & Engineered**
- **Ideal for Graphic Arts**
- **Expanded Wide Field**

Designed so that the optical element folds within the case for protection and compact carrying. Our completely new design is an improved and updated American-made version featuring our famous three-element, color corrected, Pre-Cop-Tic lens system. A true verifiable 12X magnification makes this magnifier ideal for print dot registration inspection and other demanding applications. Features fully AR-coated optics, black anodized aluminum cell and high impact plastic housing with smooth base that can rest directly on delicate art surfaces.

SPECIFICATIONS:

Eye Lens Diameter:	20mm Clear Aperture
Field of View:	12.8mm (0.5")
Working Distance:	14.7mm (0.6")
Lens System:	Kellner-Type
Weight:	2 oz.
Dimensions:	1.4" W. x 2.2" L. x 1.15 H.

12X Folding Pre-Cop-Tic Magnifier
E38,043 $49.00

EASY GRIP MAGNIFIER

- **New Improved Design**
- **Extra Long Eye Relief**
- **6X, 9X, 12X Available**
- **Acid - Resistant Base**
- **Ideal For Touch-Up Work**
- **American - Made**
- **Wide, Flat Field Of View**

Easy to pick up, even while wearing rubber gloves, this is the perfect magnifier for etchers. Design provides up to 3/4" of working space under lens cell. The clear plastic base is acid-resistant and will not block the subject matter under view. 12X and 9X are Kellner-type, color-corrected, three-element lens systems. 6X model has a precision single-element DCX lens. Wide, flat field of view. Clear handle measures approximately 3-1/2" L x 1-1/4" W x 1" H.

	6X	9X	12X
Eye Lens Diameter:	0.875"	0.680"	0.680"
Field of View:	1"	3/4"	5/8"
Working Distance:	1-1/4"	3/4"	1/2"
Lens System:	DCX-glass	Kellner-type AR coated	Kellner-type AR coated
Height Overall:	1-1/2"	1-1/4"	1-1/4"
Weight:	1.57 oz.	2.07 oz.	2.04 oz.
Item:	E30,022	E30,224	E30,223
Price:	$39.00	$44.00	$45.00

OPAQUE BASE MAGNIFIER

- **Accepts Contact Reticles**
- **Assures True Color Viewing**
- **American-Made**
- **New Improved Design**
- **Ideal For Light Table Work**
- **6X, 9X, 12X Available**
- **Extra Long Eye Relief**
- **Wide, Flat Field Of View**

Magnifier is ideal for examining negatives or for stripping work over a light table since the opaque base shuts out ambient light. Also useful for focusing images on ground glass or reflex and graphic arts process cameras. Magnifier rests directly on work area. 12X and 9X are Kellner-type, color-corrected, three-element lens systems. 6X model has a precision single-element DCX lens. Wide, flat field of view.
Accepts 27mm contact reticles in base ring.

	6X	9X	12X
Eye Lens Diameter:	0.875"	0.680"	0.680"
Field of View:	1"	3/4"	5/8"
Working Distance:	1-1/4"	3/4"	1/2"
Lens System:	DCX-glass	Kellner-type AR coated	Kellner-type AR coated
Weight:	1.20 oz.	1.44 oz.	1.41 oz.
Height:	1-1/2"	1-1/4"	1-1/4"
Item:	E30,019	E30,056	E30,054
Price:	$37.00	$39.00	$44.00
Genuine Leather Case		E36,286	$7.50

360 DEGREE SWIVEL ARM MAGNIFIER

- **Folds To Pocket Size**
- **6X, 9X, 12X Available**
- **New Improved Design**
- **Extra Long Eye Relief**
- **American-Made**
- **Wide, Flat Field Of View**

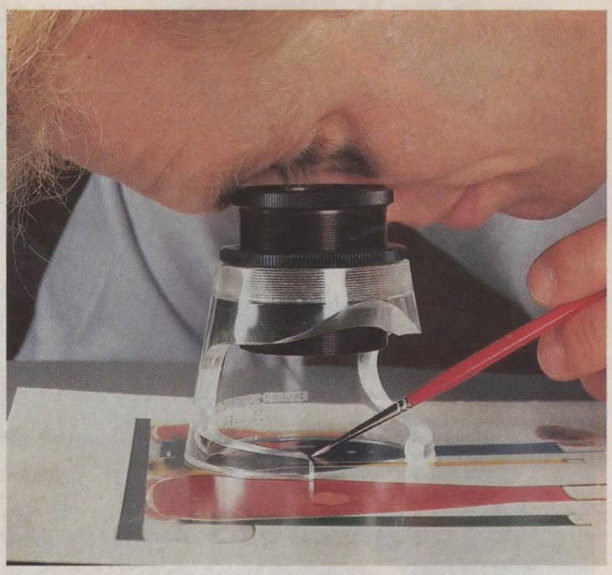
The most popular magnifier in the graphic arts field, this is superb for examining halftone dots. It rotates to any position and has a stainless steel spring that prevents wobble while holding the magnifier in position. An extremely handy unit, it provides up to 3/4" of space for correction work while viewing the material under magnification. Specially designed to keep lens cell off delicate surfaces. 12X and 9X are Kellner-type, color-corrected, three-element lens systems. 6X model has a precision single-element DCX lens. Wide, flat field of view. Folds to approximately 2" L x 1-1/8" W x 1-1/2" H.

	6X	9X	12X
Eye Lens Diameter:	0.875"	0.680"	0.680"
Field of View:	1"	3/4"	5/8"
Working Distance:	1-1/4"	3/4"	1/2"
Lens System:	DCX-glass	Kellner-type AR coated	Kellner-type AR coated
Height Overall:	1-1/2"	1-1/2"	1-1/2"
Weight:	1.57 oz.	1.81 oz.	1.78 oz.
Item:	E30,023	E30,009	E30,010
Price:	$39.00	$42.00	$45.00

THE EDMUND DELUXE 6X WIDE FIELD MAGNIFIER

- **New Improved Design / Extra Long Eye Relief**
- **Edmund Scientific Designed and Engineered**
- **Over 1" of Working Distance Under The Lens Cell**
- **220° Cutaway Base Provides Easy Access To Magnified Area**
- **Excellent Clarity & Sharpness To The Lens Edge**

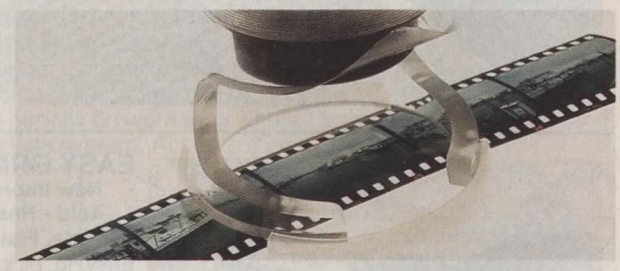
This very popular magnifier incorporates the hard-to-find combination of wide flat field, high magnification and abundant working distance under the lens. It has quickly become the standard in the Graphic Arts field since its 220° cutaway base provides the room needed for critical touch-ups and minute mechanical changes to the subject matter. The crystal-clear acrylic base was specially designed to permit both easy accessibility of tools and light to the object. Edmund's 6X Wide Field Magnifier has many outstanding design features: Double Achromatic Lens System for Total color-correction; advanced AR lens coatings to minimize internal reflections; wide Flat field design for distortion free viewing; rugged black anodized aluminum lens cell; ring lock that sets focus for repeated use.



SPECIFICATIONS:

Eye Lens Diamater:	1-1/2"	**Field of View:**	1-1/2"
Height:	3"	**Working Distance:**	1"
Weight:	6.6 ounces	**Lens System:**	Double achromats

6X Magnifier	**E42,769**	**$69.00**
Magnifier With Leather Case	**E31,327**	**$75.00**



NEW FILM STRIP/SLIDE VIEWING ADAPTER

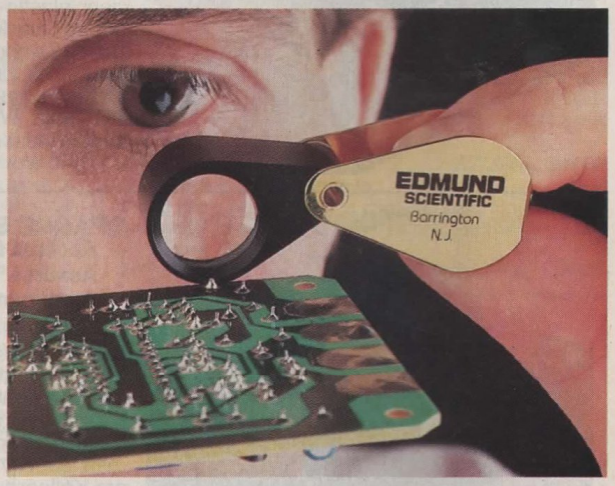
This handy flexible frosted plastic adapter snaps easily to the base of the 6X Wide Field Magnifier allowing the viewer to critically examine 35 mm slide or negative strips. Specially designed supports hold the slide or film strip in the field of view freeing both hands so that the magnifier can be held up to the light.

Slide Viewing Adapter **E36,047** **$4.95**

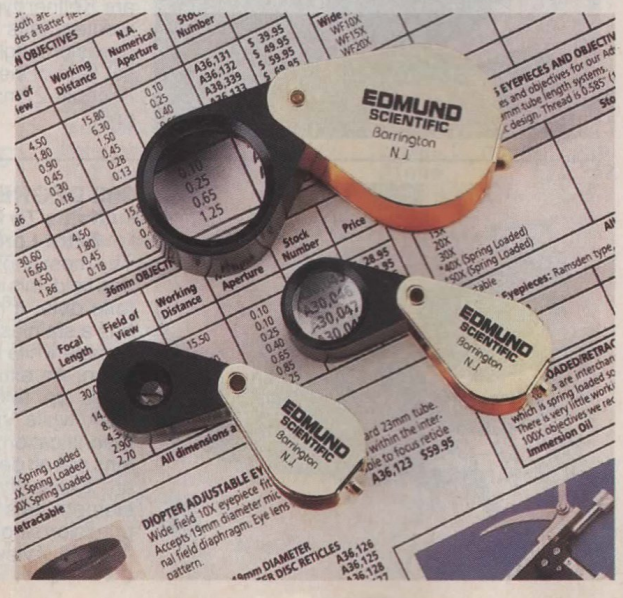
Edmund Precision Hastings Triplet System Magnifiers

THE KING OF MAGNIFIERS...EDMUND SCIENTIFIC'S FAMOUS HASTINGS TRIPLETS

- **Edmund Scientific Designed and Engineered**
- **Wide, Flat, Distortion - Free Field**
- **7X, 10X and 20X Models**
- **Corrected For Chromatic And Spherical Aberration**
- **Three-Element Triplet System**



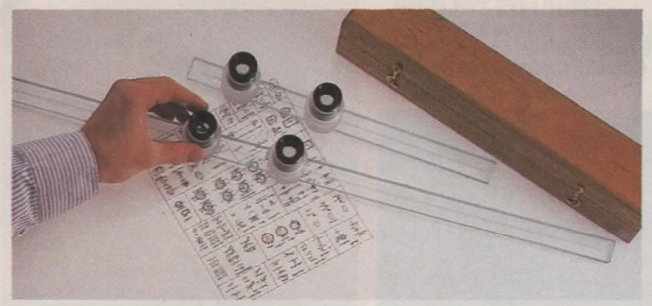
Hastings Triplets are the most popular high-power magnifiers available today, because their unique three-element design provides the ultimate in distortion-free, color-correct viewing. The lenses in the series are computer-designed to interact with each other, contributing to the reduction or elimination of "pin-cushion" distortion and chromatic and spherical aberrations. The triple lens system is made up of two concave meniscus elements cemented to a double convex lens. Unlike many inferior "Hastings" on the market, our triplets are centered and edged, an expensive process, but one necessary to achieve maximum performance. Moreover, as is appropriate for such a superior optical system, ours are mounted with threaded retaining rings in a machined black anodized metal cell, which swings into a protective brass case. The case doubles as a handle for viewing. Hastings triplets are the favorite of printers and photo-engravers who must verify the critical positioning of half-tone dots. They are also used worldwide by jewelers, gemologists, engravers, machinists, manufacturers, dermatologists and hobbyists. We caution buyers that the laws of physics are such that both the diameter and working distance of a magnifier must decline as power increases. Accordingly, the 20X system, while an excellent high-power magnifier, is relatively small and has a short working distance. Remember, the next step from the 20X Hastings is a full microscope. Conversely, the 7X will give you the biggest, brightest field of view.



UNMOUNTED HASTINGS TRIPLETS

The same superior lens system as utilized in our complete Hastings magnifiers. Available in bulk to be built into your own design or instrument. OEM applications include fiber optics, instruments, simulators, weapons guidance, quality test instruments and medical instruments. Quantity prices are available.

SPECIFICATIONS:	A	B	C
Item Number:	**E38,452**	**E30,344**	**E36,067**
Power:	7X	10X	20X
Lens Diameter:	23 mm/7/8"	15 mm/19/32"	8 mm/11/32"
Field of View:	33 mm/1-5/16"	20 mm/13/16"	10 mm/13/32"
Focal Length:	40 mm/1-9/16"	25 mm/1"	12.5 mm/1/2"
Working Distance:	37 mm/1-1/2"	22 mm/7/8"	11 mm/7/16"
Case Dimensions:	1"H x 2"L	3/4"H x 1-1/2"L	5/8"H x 1L
Price:	**$37.95**	**$32.95**	**$41.95**

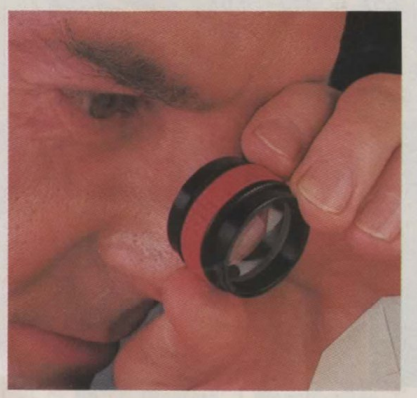


PRECISION ENGLISH/METRIC GLASS MICROSCALE SYSTEMS
• 6 Inch/12 Inch/25 Inch Measuring Systems In .002"/.05mm and .005"/.1mm
All Microscales are manufactured from chemically tempered glass and withstand the handling abuse typically found in Engineering, Drafting, Production, Inspection and Research Labs. Scale patterns are etched either in red or black into the glass and filled with MIL-I-43553 Epoxy, which provides an extremely durable and washable scale. The simultaneous readings in both inches and millimeters also makes it possible for the user to accurately extrapolate measurements to a fraction of the smallest division of either scale. For standard accuracy @ 20°C, 6 in. ±.0002", 12 in. ±.00025", and 25 in. ±.0003".

	6" Scale 1 Magnifier Case N/A	12" Scale 2 Magnifiers Hardwood Case	25" Scale 2 Magnifiers Hardwood Case
Graduation .002" /.05 mm Price	E38,076/B E38,077/R $325.00	E38,078/B E38,079/R $495.00	E38,080/B E38,081/R $975.00
Graduation .005" /.1 mm Price	E38,082/B E38,083/R $275.00	E38,084/B E38,085/R $450.00	E38,086/B E38,087/R $825.00

BAUSCH & LOMB CODDINGTON AND HASTINGS TRIPLET MAGNIFIERS
Coddingtons have a unique center groove diaphragm cut into an extra thick single element glass lens that provides wider than normal field at high power. Hastings has three lenses bonded together to form a compound lens with a 3/8" field of view. Swing-away, nickel-plated metal case doubles as a handle. American-made.

	Lens Dia.	Focal Dist.	Stock No.	Price
A) 10X Coddington	4/5" (21 mm)	1"	E35,045	$23.95
B) 20X Coddington	1/2" (12 mm)	1/2"	E35,046	$28.95
C) 20X Hastings	1/4" (7 mm)	1/4"	E35,040	$46.95



OPTICIAN'S 5X MAGNIFIER EXTRA LONG EYE RELIEF
We discovered this superb magnifier on the shop floor of a major optical manufacturer. It is the critical tool that master opticians use to inspect for scratch and dig defects on lens surfaces. To inspect their own work, they want the ultimate magnifier...the best of the trade. Such a magnifier, we recognized, would be ideal for demanding quality control inspectors, precision printers and serious collectors and hobbyists. We have arranged to manufacture this unique magnifier and have added our own improvement - the RKE® sure-grip banding on the black anodized aluminum cell. A genuine leather case is included with each master magnifier. The lens system is a precision optical glass element designed to provide both a wide flat field and extra-long eye relief, making this an ideal magnifier for eyeglass wearers.

Magnification: 5X **Eye Lens Dia.:** 11/16" (28 mm)
Field of View: 1-1/2" (35 mm) **Working Distance:** 1-1/8" (30 mm)
Weight: 1 oz. **Height:** 7/8"

Optician's Magnifier E36,221 $26.95

ADJUSTABLE 8X MAGNIFIER
• High Quality • Economical Price
Reasonably-priced yet excellent imaging and high power. Our 8X magnifier features an adjustable twist-focus eye lens so the clear acrylic base can rest directly on the subject matter. Optical system is two optical grade acrylic lens elements mounted in a molded plastic base. Includes protective clear plastic carrying case.

Magnification: 8X
Lens Diameter: 9/10
Working Distance: 1"
Field of View: 1-1/2"

8X Magnifier E35,674 $6.25
3 or More, $5.50 Each

PEAK 22X SWING LOUPE
• 360° Swivel Arm
• Ideal for Graphic Arts
Swing arm rotates to any position and folds onto base for storage and easy carry. Allows you 1/4" of work space for corrections while viewing the material. Features weighted base, knurled focus ring, matte black finish, felt lined leather case and color-corrected multi-element lens system. Made in Japan.

Eye Lens Diameter: 5/8"
Field of View: 3/8"
Working Distance: 1/4"
Lens System: Multi-Element

22X Swing Loupe E38,092 $78.00

MACROMAX 5X SLIDE AND FILM EDITOR'S MAGNIFIER
• From Arthur Seibert of Wetzlar, Ger.
Four element, fully coated, optical system provides 5X magnification over extra-large 48mm diameter field. For editing full frame of 35mm slide or film strip. Fully color corrected imaging and ultra flat field, even to the edges. Focus adjustment from +2 to -2 diopters compensates for individual eyesight. Ideal for lightbox editing. Removable diffusion screen base holds 35mm slide or film strip.

Eye Lens Dia.: 21mm (3/4")
Height: 2-7/8"
Field of View: 48mm dia. (1-7/8")
Working Distance: 3mm (1/8")

Macromax E36,935 $285.00

5X MAGNIFIER CLOSE-UP LENS FOR 35 mm SLR CAMERAS
• 5X Multiplier • Precision Reticle Scale
• Multi-Element Lens
Precision 4-element lens system offers you the ultimate in magnified close-up photography. Attaches directly to your camera lens with the included adapter ring and acts as a 5X multiplier. A precision reticle grid (2 mm x 2 mm square grid pattern in 0.1 mm increments with extended crosshair) allows you precise focus and measurement capability. The scale base is easily removed without affecting focus. Optical system consists of 4 high-index optical glass elements in 2 groups with anti-reflection coatings. Transparent base is of optical acrylic and all metal parts are black anodized aluminum. Reticle is 15 mm dia. optical glass window with photo-etched pattern. Adapter ring is available in four most common filter ring sizes: 49 mm, 52 mm, 55 mm, 58 mm. Select the right model for your camera lens as you would select a filter.

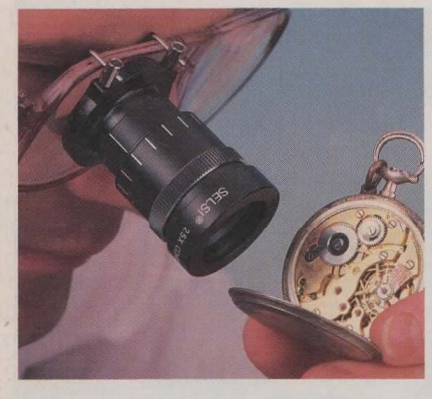
SPECIFICATIONS:
Magnification/Diopters: 5X **Weight:** 3 oz.
Eye Lens Diameter: 20 mm **Height:** 2-1/4"
Field of View: Without camera 40 mm, with camera 15 mm
Working distance: 37 mm
Lens System: 4 elements in 2 groups
Reticle Scale: 2 mm x 2 mm sq. grid with crosshair, 0.1 mmincrements

5X Magnifier With Adapter Ring $99.00 Set
49 mm Set E38,321 52 mm Set E38,322
55 mm Set E38,363 58 mm Set E38,364

PHOTOGRAPHER'S 3.5X MAGNIFIER
• Extra Long Eye Relief Styling
• Extra Large Field of View
Designed by and for the photographer, our new 3.5X magnifier is ideal for inspecting full frame negatives and proof prints. The field of view is extra-large, over 2-1/2" diameter, and the image is flat across the entire field. Extra-long eye relief (up to 6") allows for comfortable viewing. The mounting cell is designed just like the housing on an expensive 35 mm camera lens with knurled rubber sure-grip band. Two-element, air-spaced achromatic system delivers crisp, color-correct image. Padded vinyl case, measures 50 mm (2") diameter.

SPECIFICATIONS:
Magnification: 3.5X **Eye Lens Dia.:** 48 mm
Working Distance: 75 mm **Field of View:** 70 mm
Weight: 3 oz. **Height:** 3/4"
Lens System: 2 PCX lenses, air-space achromatic system.

Deluxe Photo Magnifier E37,701 $56.00



CLIP-ON EYEGLASS MONOCULARS

Both of these monoculars clip directly to your eyeglass frame to provide magnification with extra long working distance (approx. 23" to infinity). With two you can build your own stereo eyeglasses for micro-assembly work.

Deluxe 2.5X Monocular

Fully coated achromatic 24mm objective lens mounted in an anodized aluminum body with diopter-adjustable twist focus, screw-adjustable mounting wire for precision fit, and short focus adapter with 3 accessory lenses (.50, 1.0, 2.0 diopters). Measures 35mm external dia. x 58mm l.

Specifications:

Magnification:	2.5X
Objective Lens Diameter:	24mm (achromat lens system)
Eye Lens Diameter:	13mm
Focus:	Twist focus 23" to ∞

2.5X Monocular E36,933 $75.00

Economy 2.8X Monocular

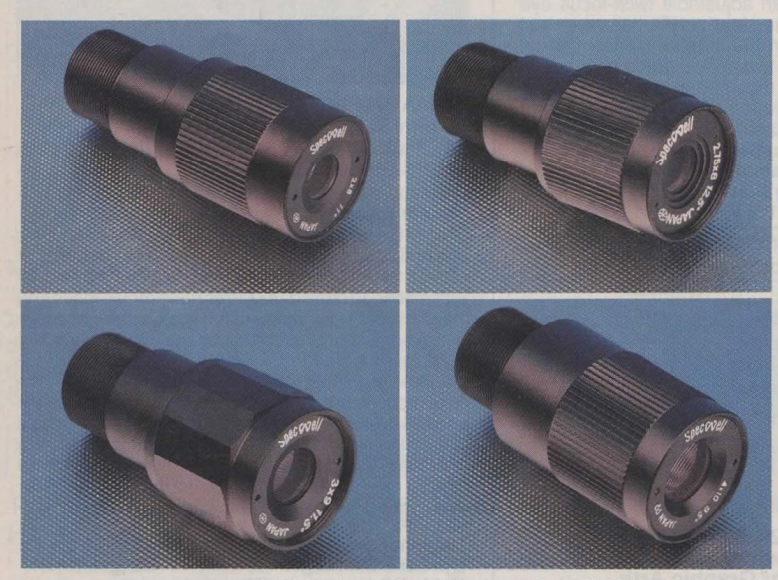
Features plastic lenses mounted in a plastic body with diopter adjustable twist focus, bendable mounting wire. Measures 35mm external diameter x 50mm long.

Specifications:

Magnification:	2.8X
Objective Lens Diameter:	26mm (simple lens system)
Eye Lens Diameter:	10mm
Focus:	Twist focus 14" to ∞

2.8X Monocular

E36,932 $34.95



EXTRA CLOSE FOCUS/COMPACT, LIGHTWEIGHT MONOCULAR/MAGNIFIERS

Very compact and extremely lightweight, our combination monocular/magnifier instruments are the solution to demanding precision work applications. Models focus from as close to the subject as 4" all the way to infinity. All models feature precision anti-reflection coated optical systems with smooth spiral twist focus and a roof prism erector system to provide a correct image as your eye would see it. Each monocular/magnifier comes for hand-held use. Accessory clamps (available separately) easily mount on eyeglasses for flip-up or fixed action. Each style mount must be ordered separately. Each instrument has a thread section on the eyepiece end which screws into the mount of choice (hand-held eye cup, flip-up eyeglass mount or fixed clamp eyeglass mount.) We also offer a set of retaining lock rings which can be used to mount the instruments in a 5/8" thru-hole.

Stock No.:	E38,515	E36,934	E38,516	E38,517
Price:	$149.95	$149.95	$149.95	$149.95
As a Magnifier (Close Focus)				
Magnification:	5X	3.5X	3.6X	5X
Field of View:	1/2"	1"	1-1/4"	3/4"
Close Focus Distance:	4"	6"	8"	8"
As a Monocular (Distant Focus)				
Magnification:	2X	2.75X	3X	4X
Field of View (1,000 yds.):	195 yds.	220 yds.	200 yds.	148 yds.
Field of View (Degrees):	11°	12.5°	11.5°	9.5°
Objective Lens Diameter:	8 mm	8 mm	9 mm	10 mm
Exit Pupil:	4 mm	2.9 mm	3 mm	2.6 mm
Height (Maximum):	2-1/4"	1-7/8"	1-7/8"	2-1/2"
Diameter:	7/8"	7/8"	7/8"	7/8"
Weight (Scope Only):	0.9oz.	0.8oz.	0.8oz.	1.0oz.

ACCESSORY MOUNTS:

Flip-up Eyeglass Mount	E38,518	$30.00 Each
Fixed Clamp Eyeglass Mount	E38,519	$22.00 Each
Lock-Ring Set. Set of 4 rings.	E38,520	$10.00 Each
New Full Open Eyeglass Frame (Dual Mounts/Flips Up)	E39,137	$155.00 Each

STEREOMAX 3X STEREOSCOPIC EYEGLASS MAGNIFIER

Designed for micro-surgeons, these eyeglass magnifiers provide a brilliant stereoscopic view over a +1-1/2" field with huge depth of sharpness. Eyeglasses are adjustable for interpupilary eye distance from 58mm to 70mm (2-1/4" to 2-3/4" approx.). Focus is achieved by slight movement of head relative to object. Velvet padded leather case and durable acrylic frame.

Specifications:

Magnification:	3X	**Objective Lens Diameter:**	27mm
Eye Lens Diameter:	8mm	**Field of View:**	40mm
Working Distance:	200mm	**Weight:**	110g (2 ozs. approximately)

3X Stereo Magnifier **E36,938 $395.00**

COIL HIGH-POWER EYEGLASS LOUPES

• Acrylic Safety Lens **• Flip-up Design**

Coil of England is known for their precision high quality acrylic magnifiers. This design attaches directly to your own eyeglasses with vinyl scratch-guard spring clips and it is hinged so it can flip-up easily out of your field of vision. The unique thru-lens mounting arrangement means no distracting edge-rim around the lens edge. Lens measures 1-3/8"W x 1-5/8"H, entire unit weighs only 1/2 oz.

Magnification:	2.5X	3.5X	4.75X
Field of View:	4"	2.75"	1.5"
Working Distance:	5"	3.5"	2.5"
Stock Number:	E38,521	E38,522	E38,523
Price:	$29.95	$29.95	$32.95

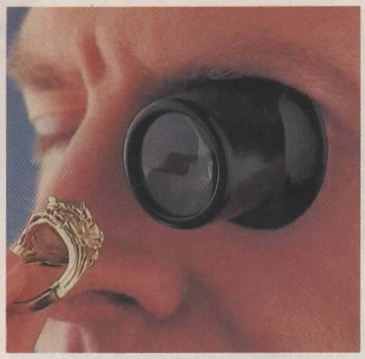
BINO-VISION EYEGLASS MAGNIFIERS

• Acrylic Safety Lens **• Flip-up Design**

Unique side-by-side bino-lens design provides full vision magnification with normal stereo effect. Lightweight construction with flip-up feature for quick return to normal vision. Clip-on model attaches directly to your own eyeglasses with rubber coated scratch-guard spring clip. Full frame model is worn as normal glasses. Comes with protective case.

Magnification: 2.5X **Lens Dimension:** 2-7/8"Lx1-1/8"W
Working Distance: 4" **Field of View:** 2-1/2"

Clip-on Bino-Magnifier. Weighs 0.7 oz. **E38,524 $31.00**
Full Frame Bino-Magnifier. Weighs 1.3 oz. **E38,525 $41.00**



JEWELERS EYELOUPES

- Three Styles-With or Without Headband, or Eyeglass Holder
- Lenses Are Made Of Optical Glass
- Rests Comfortably In The Eye Socket

Bausch and Lomb Models:

Magnification	Lens Diameter	Focal Length	Without Headband Item/Price	With Headband Item/Price
4X	1″	2″	E35,050/$11.00	E35,055/$17.95
7X	1″	1.5″	E35,051/$11.00	E35,056/$17.95
4X-7X	⅞″/½″	2.5″/1.5″	E35,053/$22.00	E35,057/$28.95
10X	1″	1″	E36,287/$12.95	E36,288/$19.95
5X	1″	2″	E36,289/$11.00	E36,290/$17.95

Edmund Scientific Economy Models:

Magnification	Lens Diameter	Focal Length	Without Headband Item/Price	With Headband Item/Price
Single Power: single element lens.				
3X	⅞″	2½″	E36,112/$7.00	E36,110/$8.75
4X	⅞″	2″	E36,113/$7.00	E36,109/$8.75
5X	⅞″	1½″	E36,114/$7.00	E36,108/$8.75
Dual Power: two element lens system, screws apart				
4X/10X	¾″/⅝″	2″/⅝″	E40,150/$10.50	E36,111/$13.75

Headband For Watchmaker's Loupes. Soft spandex material. E38,716 $6.00

JEWELERS EYELOUPES FREE YOUR HANDS WHILE YOU WORK ON DETAIL
All of the eyeloupes listed to the right feature optical-quality glass lenses mounted in plastic eye cup cells. Watchmakers and jewelers hold the cell in their eye socket by squinting slightly. Some models are available with a spring steel headband which assists in keeping the cell in place. Diameter of the base that rests in your eye socket is approximately 1½″.

EASY-ON SINGLE EYEGLASS LOUPES

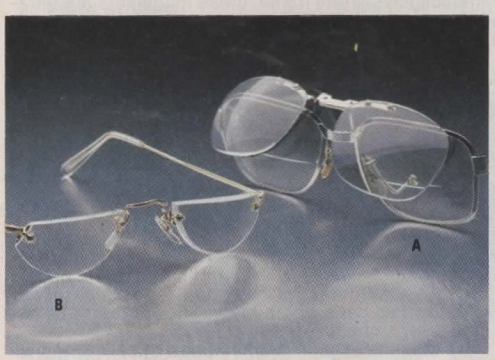
Spring steel clips. 360 degree loop. Fully adjustable. Precision lenses. Used by jewelers, trade craftsmen, industrial technicians and hobbyists.

	Focal Distance	Lens Diameter	Diopters	Item	Price
2XBehr	5″	24mm	8	E40,510	$20.95
4XBehr	2.5″	24mm	16	E40,511	$20.95
3X B & L	3.3″	24mm	12	E35,033	$28.95
5X B & L	2″	24mm	20	E35,034	$29.95
7X B & L	1.5″	24mm	28	E35,035	$31.95

DOUBLE LOUPES FOR EXTRA MAGNIFICATION POWER

Double loupes provide extra magnification power compared to single loupes. Easy mount to either left or right side of eyeglass frame. Precision ground lenses. Spring steel clip.

	Focal Distance	Lens Diameter	Diopters	Item	Price
3X-5X Behr	3.5″,2″	24mm, 20mm	12-20	E40,513	$29.95
3X-5X B & L	3.3″,2″	24mm, 20mm	12-20	E35,037	$36.95
4X-7X B & L	2.5″,1.5″	24mm, 17mm	16-28	E35,038	$36.95
5X-10X Behr	2″,1″	24mm, 15mm	20-40	E40,514	$29.95



EYEGLASS-TYPE MAGNIFIERS FROM ENGLAND

A) Flip-Up/Clip-On Magnifiers. These models clip directly to your eyeglass frame and can be flipped up when not in use. Lenses are shatterproof plus-spherical acrylic with metal clip. Working distance decreases as power increases.

Stock No.	Diopters	Magnification	Price
E36,926	4	2X	$79.95
E36,927	6	2.5X	$79.95
E36,928	8	3X	$79.95
E36,929	10	3.5X	$79.95
E36,930	12	4X	$79.95

Two or more of any above magnifier $74.95 each

We're Sorry. The Half-Eye Inspection Magnifiers, shown above, left are no longer available.

TELESIGHT BINOCULAR MAGNIFIERS REDUCE EYESTRAIN

- Optical Quality Acrylic Lenses With New Mar Resistant Coating.
- Prism Edged in For Easier Near Point Viewing
- Flips Up When Magnified Vision Not Required

These convenient magnifiers provide eyeglass users with enlarged views without loss of correction due to the glasses. Three styles to choose from, clip-on frame (A), half-frame (B), and full frame unit (not shown). Lightweight, 1 oz. A very popular and useful tool for professionals, craftsmen, hobbyists, and people suffering from subnormal vision.

A. Clip-On	B. Half-Frame	C. Full-Frame	Power	Working Distance
E50,240 $26.95	E37,245 $28.95	E37,248 $28.95	2X	10″
E37,244 $26.95	E37,246 $28.95	E37,249 $28.95	2½X	6⅔″
E50,242 $28.95	E37,247 $29.95	E37,250 $29.95	3X	5″

FLIP-UP BINOCULAR MAGNIFIERS

The binocular magnifiers eliminate squinting while providing great depth of field. Recessed Lucite lens. Eye shade. Fully adjustable, padded leatherette headband.

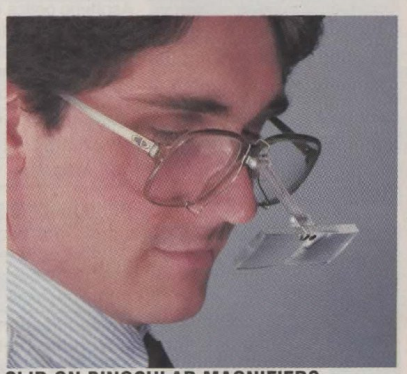
Power	Working Distance	Stock No.	Price
1.75X	14″	E70,699	$20.95
2.25X	8″	E70,698	$20.95
2.75X	6″	E70,697	$22.95

Accessory 2.5X Swing-in Loupe for #70,699. E40,736 $6.95

ECONOMY BINOCULAR MAGNIFIER

A favorite of hobbyists and shop workers handling detail work over long period of time. Scratch-resistant acrylic lenses give **2½X magnification** and 3D viewing. Padded, adjustable headband. Can be worn over eyeglasses. **10″ working distance.** Lens portion tilts up when not in use.

Binocular Magnifier E35,681 $18.95

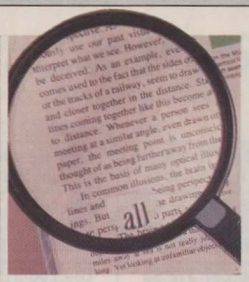


CLIP-ON BINOCULAR MAGNIFIERS

Optically-correct magnifiers leave both hands free for work. Tension clip holds secure. Weighs just two ounces. Clips easily onto any eyeglass frame. With carrying case. Measures about 3½″L × 1¼″H × ⅛″T.

Clip-On Magnifiers $24.95 each

Power	Working Distance	Stock No.	Price
1.75X	14″	E41,729	$24.95
2.25X	8″	E41,730	$24.95
2.75X	6″	E41,731	$24.95
3.5X	4″	E41,732	$24.95

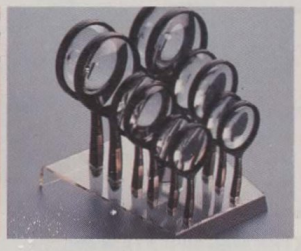


EDMUND LIGHTWEIGHT ACRYLIC READING GLASS MAGNIFIERS

• Better Grade Aspheric Bifocal Magnifiers
• Extra Sharp Image Plus Extra Wide Field

Hi-tech design, ultra-lightweight materials and precision aspheric lenses make these magnifiers ideal for extended use applications. Aspheric lens provides extra-wide flat field of view. Larger, lower power models have a high power 5X lens molded into the main lens so you can inspect fine detail. Shatterproof and impact-resistant lens and handle.

Magnification:	3X	2.5X	2.3X/5X	2X/5X
Lens Diameter:	2-1/2"	3"	3-1/2"	4"
Working Distance:	6"	7"	8"/2"	10"/2"
Field of View:	3-1/2"	4"	6"/1"	8"/1"
Item:	**E37,404**	**E37,405**	**E37,406**	**E37,407**
Price:	**$9.95**	**$11.95**	**$17.95**	**$21.95**



BIFOCAL ACRYLIC READING GLASSES

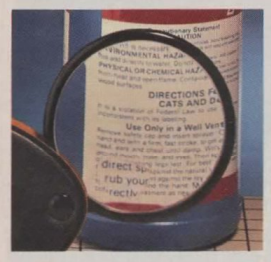
Our bifocal magnifiers feature two magnifications in one reading glass. Each has a higher power mini-lens set into the main lens so you can quickly switch to detail inspection. These shatterproof acrylic optics provide safety and an excellent view at a reasonable price.

Magnification	2X/4X	2X/4X	2.5X/5X
Lens Diameter:	3"/3/4"	2-1/2"/5/8"	1-7/8"/1/2"
Working Dist.:	5-1/2"/2"	4-1/2"/2"	3-1/2"/2"
Item:	**E36,229**	**E36,230**	**E36,231**
Price:	**$3.50**	**$3.00**	**$2.50**

DELUXE 3X ASPHERIC MAGNIFIER

Aspheric optics cost more but give you a flat, undistorted field plus the safety advantage of shatterproof acrylic. Our 3X aspheric flips out of a 3" L x 2" W x 1/2" H hard case which doubles as a handle. Case protects magnifier from scratches and it travels nicely in your pocket.

Magnification:	3X	Lens Dia.:	2"
Working Distance:	3"	Field of View:	3-1/4"
3X Magnifier		**E36,244**	**$7.25**



FOLDING BIFOCAL MAGNIFIER

Large 2-1/2" bifocal magnifier folds into vinyl pouch which doubles as a handle. 2X magnifier is ideal for phone number, etc. and the powerful 3X bifocal inset is handy for extra fine detail. Lens is made of optical quality acrylic.

Magnification:	2X	3X	
Working Distance:	5-1/2	2-1/2"	
Field of View:	5"	1/2"	
Folding Bifocal		**E35,675**	**$5.75 Each**
25-99 pieces,			**$5.25 Each**
100 or more,			**$4.75 Each**

3X/5X BIFOCAL CASE MAGNIFIER

Made of shatterproof optical-quality acrylic, 3X/5X bifocal magnifier swings out of a padded soft vinyl case (2-1/2" L x 2" W) which doubles as a handle and protects the lens.

Magnification:	3X	5X	
Lens Diameter:	1-7/8"	1/2"	
Working Distance:	3"	1-1/2"	
Field of View:	3"	1/4"	
3X/5X Magnifier		**E36,242**	**$3.75**
		12 or more, $3.00 Each	

2.5X SQUARE MAGNIFIER WITH ADJUSTABLE PIVOTING HANDLE

• Extra Comfort For Extended Viewing **• Exceptional Value**

The innovative adjustable pivoting handle makes this magnifier one of the most comfortable low vision aids to use. The handle pivots through a full 130° arc allowing the viewer a wide variety of holding options. A soft rubber pad on the base of the handle also allows you to rest the magnifier directly on the work or table for extra support and comfort. Made of high-impact ABS plastic frame. Extremely lightweight (weighs only 4.5 ozs.).

Dimensions: 3-3/4" square frame with 4-1/2" long handle.
Power: 2.5X **Lens Dimensions:** 3-1/8" x 3-1/8"
Working Distance: 3-1/2" **Field Of View:** 5"

2.5X Magnifier with Adjustable Handle **E38,457 $21.95**

A) HIGH POWER 5X ROUND ASPHERIC MAGNIFIER BY BAUSCH & LOMB

• Ideal Low Vision Aid **• Lightweight Acrylic Lens**

Unique aspheric design provides the desired combination of high power and a wide flat undistorted field of view. The shatterproof acrylic lens is anti-reflection coated to reduce glare and improve image quality, and is mounted in a high impact black plastic handle. An ideal choice for cataract patients, senior citizens and all who require additional low vision enhancement for reading. In addition, this aspheric magnifier will also appeal to industrial inspectors; scientific researchers; photographers; artists; hobbyists; stamp and coin collectors who require precise enlargement of fine detail.

Magnification: 5X/20 Diopters **Lens Diameter:** 2" (50 mm)
Working Distance: 1-1/2" **Field of View:** 1-1/2"

5X Aspheric Magnifier **E35,672 $31.95**

B) LIGHTWEIGHT BICONVEX SQUARE ASPHERIC MAGNIFIERS

Made by Coil in England, these very special Biconvex aspheric lenses provide undistorted magnification over a field of view which is larger than any other conventional spherical lens at a comparable price. Made of a special optical acrylic and mounted in a black high-impact polystyrene frame, these magnifiers are ultra-light for their size and thus ideal for extended viewing and reading.

	Power	Working Distance	Field of View	Lens Aperture	Stock No.	Price
A)	2.5X	6-1/2"	6-1/4x4-1/2"	4x3"	**E35,324**	**$64.95**
B)	2.62X	6"	6"x5"	3-1/4"x2-1/2"	**E37,502**	**$32.95**

HANDS-FREE MAGNI-VIEWER

• Ideal For Any Small Hand and Sewing Work

Lightweight magnifier is designed to leave your hands free to work. Secures around your neck; cord is adjustable. Made of shatterproof optical acrylic. Sharp edge-to-edge view. Sponge rubber contact pads where Magni-Viewer rests against user's chest.

Magnification: 2X **Lens Dia.:** 6" Diagonal
Working Distance: 15" **Field of View:** 10".
Hands Free Magnifier **E61,241** **$24.95**

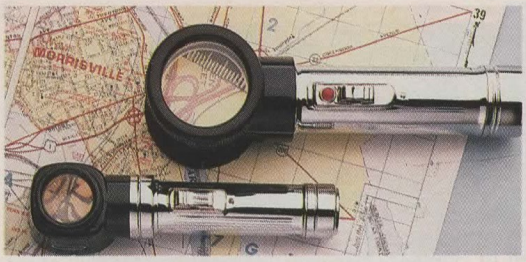
3X/5X BIFOCAL MAGNIFIER

Two magnifiers in one compact handle. 4-1/2" long overall, 2" diameter head, 1/4" thick. Shatterproof optical grade acrylic. Lenses mounted side by side.

Magnification:	3X	5X	
Lens Diameter:	1-3/4"	5/8"	
Working Distance:	2"	1-1/2"	
3X/5X Bifocal		**E36,241**	**$1.95**
		12 or more, $1.52 Each	

3X MINI READING GLASS

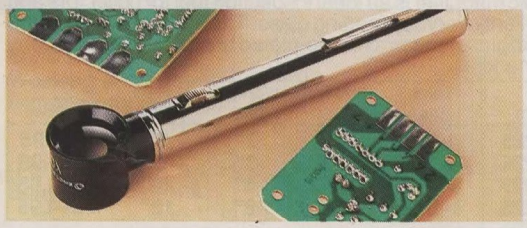
Made of optical-quality acrylic, this compact magnifier is shatterproof. Ideal for young scientists. 4" overall length, 2" diameter head, 1/4" thick. 3X;
Lens Dia.: 1-1/2"; **Working Distance:** 2".
3X Mini Reading Glass **E36,240** **$1.50**
12 or more, $1.00 Each



FLASHLIGHT MAGNIFIERS
• Double Lens System • Wide Flat Field

Our deluxe flashlight magnifiers feature a two-element optical white glass PCX lens system to provide a wide angle, flat field view. Performance is further enhanced by concentrating illumination directly on the subject matter. They are battery powered and thus very portable. Rugged metal body construction.

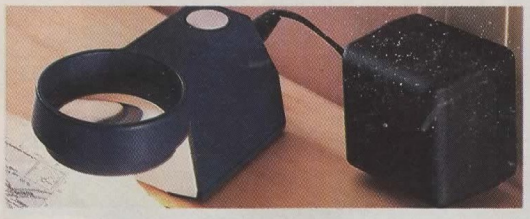
Magnification:	5X	10X
Lens Diameter:	1-3/4"	1-1/16"
Working Distance:	1-3/8"	3/4"
Field of View:	1-1/4"	3/4"
Power Requirements:	2 "D" batteries	2 "C" batteries
Item:	E50,154	E35,676
Price:	$24.95	$24.95



BAUSCH & LOMB ILLUMINATED CODDINGTON

Single thick lens with central groove diaphragm for high resolution images. Illumination through the groove provides exceptional clarity. Takes two "AA" batteries (not included).

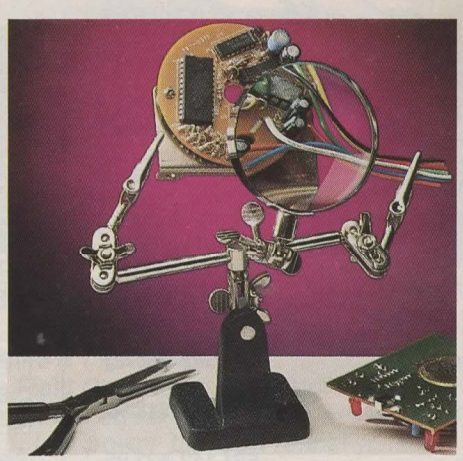
Magnification:	5X	10X
Lens Diameter:	3/8"	3/8"
Working Distance:	1-1/4"	5/8"
Diopters:	20D	40D
Field of View:	1-1/4"	5/8"
Item Number:	E35,027	E42,812
Price	$21.95	$26.95



ILLUMINATED ASPHERIC MAGNIFIER

Extremely bright work station magnifiers with halogen lamp and power supply which operates on 115VAC. On/Off switch built into magnifier body. Ample working space below the lens. Tilt mechanism for comfortable position. Optics are optically-clear polymethyl methacrylate and coated with polysiloxane which protects the lenses from most abrasion in normal use and cleaning. Refractive index of coating is approx. 1.43 to 149 and acts as an anti-reflection coating giving a light transmission factor greater than 95%. Transformer cord 9' long.

Power	Lens Dia.	Working Distance	Field of View	Item No.	Price
6X	50 mm	43 mm	45 mm	E38,471	$99.95
8X	44 mm	35 mm	30 mm	E38,472	$99.95
10X	36 mm	25 mm	20 mm	E38,473	$99.95
12X	34 mm	23 mm	15 mm	E38,474	$99.95
Replacement Bulb (1)				E38,616	$18.95



"HELPING HANDS" WITH MAGNIFIER

Ideal for hobbyists and assembly workers, this work station magnifier comes with 2 pivoting alligator clip arms to position components within the magnifier's field of view. Cast iron base is 2-1/4"L x 2-1/4"W x 2-1/4"H. Entire assembly pivots at base connect; individual arms pivot and magnifier pivots and slides along main arm 4"L. Alligator arms have 1/2"L jaw with 1/2" maximum opening. Entire assembly approximately 8"H. Magnifier is 2X magnification, 2-1/2" diameter.

Helping Hands Magnifier
E39,064 $9.95

ILLUMINATED ACRYLIC MAGNIFIERS

• Hi-Tech Lightweight Plastic Body
• Bifocal And Single Power Designs • Shatterproof Optical Grade Acrylic Lens

Our economical hi-tech design illuminated magnifiers give you all the features of much more expensive models. A shatterproof optical grade acrylic lens is mounted in a comfortable-to-hold handle and a built-in mini-bulb illuminates the field of view. The bifocal design provides the convenience of two magnifications in one frame. Batteries are not included.

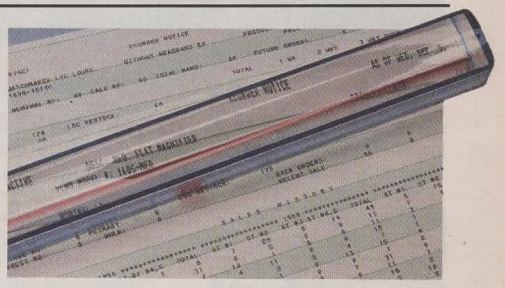
SPECIFICATIONS:

	SQUARE			ROUND BIFOCAL		
Magnification:	3X	2.5X	2X	2.5/5X	2/4X	2/4X
Lens Diameter:	1-1/4"	1-1/2"	1-3/4"	2"/1/2"	2-1/2"/5/8"	3"/3/4"
Working Distance:	1-3/4"	2-1/4"	3-1/4"	3-1/4"/ 1-1/2"	4-1/2"/2"	6"/2"
Field of View:	1"	2"	3"	3"/1/2"	4"/5/8"	5"/3/4"
Power Requirements:	2"AAA"	2"AA"	2"AA"	2"AAA"	2"AA"	2"AA"
Stock No.:	E36,234	E36,235	E36,236	E38,325	E38,326	E38,327
Price:	$5.00	$5.25	$5.50	$6.25	$6.75	$7.25
Replacement Bulb (1)					E36,237	$1.25

HI-TECH 2X + 2X DOUBLE LENS ILLUMINATED AC/DC MAGNIFIER

New Hi-Tech design brings you this lightweight magnifier with an exceptionally large field of view. System consists of two shatterproof acrylic 2X elements which snap apart to change power. Anti-static coating repels dust . AC adapter plugs into 110V or unit can be powered by 2"C" batteries. High-impact plastic body. Extra bulb included. Weighs only 8 ounces.

Magnification:	2X	2X + 2X(3X)
Lens Diameter:	4"	4"
Working Distance:	6"	4"
Field of View:	8"	4"
Electro-Optix Magnifier	E35,151	$47.95



COMPUTER REPORT 2X MAGNIFIER

• Bright Red Highlight Line
• Scan Data Quickly

The ideal aid for scanning standard 15" wide computer reports line by line. Acrylic 2X cylinder magnifier is mounted on a clear, hollow plastic base which allows light in and positions the magnifier at the proper height for viewing. A removable insert displays a bright red line across the center of the field of view to highlight a specific line of data. Several lines of data are visible within the field. Overall dimensions are 14"L x 1-1/4"H x 1-1/2"W.

Computer Report Magnifier
E39,059 $24.95

FOLDING MULTI-LENS POCKET MAGNIFIERS FROM BAUSCH & LOMB

- **High Quality Optical Glass Lenses**
- **Wide Range Of Powers**

Available in both two and three lens models, these pocket magnifier systems are extremely versatile since the lenses can be used alone or in combination to provide several different powers. By combining lenses, three powers are available with the two-lens models; seven different powers are possible with the three lens system. A swing-away case of tough durable plastic serves both as a handle and as a protective case.

1) **4X-9X Double Lens Magnifier.** 1" lens dia.; 2.5" to 1.1" focal distance; 16 to 36 diopters. **E35,042 $18.95**
2) **5X-12X Double Lens Magnifier.** 3/4" lens dia.; 2" to 0.8" focal distance; 20 to 48 diopters **E35,043 $18.95**
3) **5X-20X Triple Lens Magnifier.** 3/4" lens dia.; 2" to 0.5" focal distance; 20 to 80 diopters. **E31,142 $23.95**

EDMUND MACHINIST'S 3-LENS FOLDING POCKET MAGNIFIER

Over seven different power possibilities by using the 3-lens individually or in combination for a magnification range from 3X to 12X. DCX optical glass elements are mounted in machined aluminum cells that swing into the protective cover/handle. There is a 1/4" hole in the case so that you can view 12X—3 lenses in combination without opening the case.

Magnification	3X	4X	5X	6X (3X+4X)	7X (3X+5X)	8X (4X+5X)	12X (ALL)
Lens Dia.	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
Working Dis.	3-1/2"	2-1/2"	2"	1-3/8"	1-1/8"	1"	3/4"
Field of View	1-3/4"	1-1/2"	1-1/4"	1-1/8"	1"	7/8"	5/8"

Machinist's Magnifier **E38,331 $22.95**
3 or More, $19.95 Ea.

EDMUND FOLDING 3-LENS POCKET MAGNIFIER

3 magnifications in one compact pocket case. Each optical-quality glass DCX lens is 3X; used in combination they provide 6X and 9X magnification. The lenses fold into a sturdy black high-impact plastic case which doubles as a handle for viewing.

Pocket Magnifier **E40,032 $15.50**

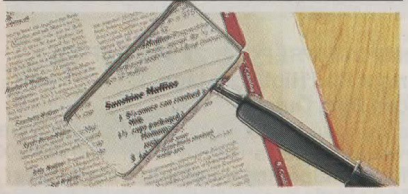
Magnification:	3X	6X	9X
Lens Diameter:	7/8"	7/8"	7/8"
Working Distance:	3"	1-1/2"	1"
Field of View:	1-1/2"	1"	3/4"

FOLDING POCKET 3X MAGNIFIER

Our handy 3X glass magnifier provides an excellent enlarged image and slips conveniently into your pocket. The simulated black leather case doubles as a handle.

Lens Diameter 1-3/4"; **Magnification** 3X;
Field of View 2-1/2"; **Working Dis.** 3";

Pocket Magnifier **E40,024 $3.25**
10 or More, $3.00 Each



RECTANGULAR 2X READER-MAGNIFIER

Efficient rectangular shape offers maximum wide field of view at minimum weight because unusable areas around the edge are eliminated while the large reading area is retained. Chrome lens rim. Solid plastic handle. Optical glass lens.

Magnification: 2X **Lens Dimension:** 4" x2"
Working Distance: 6" **Field of View:** 7"

2X Magnifier **E35,028 $13.95**

4X-6X-10X FOLDING POCKET MAGNIFIER

- **Multi Pricing Available**

An inexpensive acrylic lens version of our popular multi-lens folding magnifier. By using each lens separately, or in combination, 3 powers are possible. Lenses swing into protective plastic case which also serves as a handle.

Magnification:	4X	6X	10X (4X & 6X)
Working Distance:	2-1/4"	1-1/8"	1/2"
Field of View:	2"	1"	3/4"

Pocket Magnifier **E38,657 $4.75**
10 - 24, $4.50 Each **25 - 99, $4.25 Each**
100 or More, $3.75 Each

10X COMPOUND LENS MAGNIFIER

Combines high power and convenient hand-held design. Dual element glass optical system provides wide flat field of view. Measures 5" long, 1-3/8" dia. cell, weighs 1-1/2 oz. Knurled handle for sure grip.

Magnification: 10X
Eye Lens Diameter: 1"
Field of View: 1-1/4"
Working Distance: 1"

10X Magnifier
E35,359 $21.95

DETECTIVE'S WOOD HANDLE MAGNIFIER

Right out of Sherlock Holmes, precision glass lenses in a chrome-plated brass frame with genuine hard-wood handle.

Item	Power	Lens Dia.	Working Dis.	Field of View	Price
E36,222	3X	2-1/2"	3"	2-3/4"	$12.95
E36,223	2X	3-1/2"	4"	5"	$15.95
E36,224	2X	4-1/2"	6"	10"	$20.95

COLLECTOR'S READING GLASS MAGNIFIER

Our basic magnifier is an ideal inspection tool for collectors and an excellent everyday reading glass. These magnifiers feature precision glass lenses, chrome-plated brass frames and ebony plastic handles.

Item	Lens Dia.	Power	Working Dis.	Field of View	Price
E36,225	1-3/4"	4X	2"	2"	$4.95
E36,226	2-1/2"	2.5X	3"	3-1/2"	$6.95
E36,227	3-1/2"	2X	4"	6"	$10.95
E36,228	4-1/2"	2X	6"	10"	$14.95

BAUSCH AND LOMB ROUND READER MAGNIFIER

Round soft gray handles that are shaped to better conform with the natural way of holding a magnifier. Optical-quality glass lenses provide wide field viewing with crisp, sharp images at all points. The lens is recessed in one-piece frame to prevent chips and scratches.

Lens Dia.	Power	Working Dist.	Field of View	Item	Price
2"	2X	10"/24.4cm	3"	E35,032	$19.95
2.5"	2X	5"/12.7cm	4"	E35,031	$12.95
3.25"	2X	6.5"/16.5cm	6.5"	E42,716	$14.95
5"	2X	12"/30.5cm	11"	E42,717	$25.95

REDUCING GLASS MAKES OBJECTS APPEAR SMALLER

The higher you raise the glass...the smaller the object will appear. Ideal for reading X-rays, light gray areas appear more pronounced. Artists and photographers can see how a scene will appear when it is reduced in size.

Reduction: Approx. 50% at 4" working dist. **Handle:** 4-3/8" long.
Lens Diameter: 3-1/2" mounted in chrome ring. **Weight:** 5.5 oz.
Field of View: 8" thru 400' **Focal Length:** -215 mm

Reducing Glass **E33,460 $27.95**

EDMUND FOLDING INSPECTION MAGNIFIERS/LINEN TESTERS

Known in the trade as "Linen Testers" these collapsible pocket magnifiers are most popular with collectors, quality inspectors and hobbyists. The optical system is a single element precision glass DCX lens. The housing is made of machined aluminum, black anodized for a high tech look. These magnifiers fold flat to fit in your pocket and genuine leather cases are an option. Scales are etched on the inner faces of the viewer's base (1/8" increments).

Magnification:	6X	9X
Lens Diameter:	1-1/16"	1/2"
Working Distance:	1-1/2"	1"
Dimensions (Set-up) :	2"H x 1-1/2"W x 2"L	1-1/4"H x 1"W x 1-1/2"L
(Folded):	1/2"H	1/2"H
Scale Graduations:	0 to 1" in 1/8" increments	0 to 1/2" in 1/8" increments
Field of View:	1"	1/2"
6X Tester Only	E40,030	$15.95
6X Tester & Leather Case	E31,313	$18.95
9X Tester Only	E40,031	$14.95
9X Tester & Leather Case	E31,314	$17.95

EDMUND 6X LINEN / PRODUCT TESTER WITH MOVABLE POINTER IN BASE

Excellent for counting threads in textiles, examining stamps, printing, engravings, circuit boards, etc. Linen and product tester has 1-1/16" lens diameter and 1-1/2" working distance. Features a folding aluminum stand for hands-free work. Includes graduated scale at base. Scale is graduated from 0" to 1" in 1/8" increments. Tester is 2" high, 1-1/2" wide and 2-1/4" deep. Comes with movable pointer for counting. Here's a magnifier you can carry in your pocket for a really close-up inspection anytime.

6X Linen /Product Tester **E33,415 $29.50**

FRESNEL MAGNIFIERS

- **Low Vision Aids**
- **Portable & Lightweight**
- **Wide Field Coverage**

Although not equal to glass for image formation, low power plastic Fresnel lenses offer wide field coverage. Not recommended for extended usage as they will cause eye strain.

A) MULTI-IMAGE FRESNEL MAGNIFIER

• 25 Repeat Images At One Glance!

Our dual purpose Fresnel contains two tools in one large 9-3/4" x 7" sheet of pliable 0.5 mm thick acrylic. A 2X magnifier that covers a 3" x 6-3/4" field lets you examine fine detail. Look through multi-image negative fresnel 6-1/2" x 6-3/4" and you see 25 repeat images of one scene.
Each mini frame measures 1-1/4" square.

25 Repeat Fresnel **E36,259 $7.50**
3 or more, $6.50 Each

B) CREDIT CARD SIZE FRESNEL MAGNIFIER / READER

• Ideal Premium/Ad Specialty

Our very popular credit card size fresnel, 3-1/4"L x 2"W, comes with its own protective case and fits anywhere a standard credit card would go. Actual viewing area is 1-11/16" x 3-1/8" with border area to fill; flexible case dimensions are 2-1/4" W x 3-5/8"L. Super-thin, 0.4 mm thick; **Magnification:** 3X. Can be custom imprinted in quantities of 5,000 or more. (Please call for quotation.)

Credit Card Fresnel **E38,456 $1.50**
5-49, $1.25 Each **50 or more, $1.00 Each**

SPRING-LOADED POP-UP 9X LINEN TESTER

Our new model is spring loaded so that it pops open for fast set-up. Extra compact, it folds flat to only 1/4" thick. The optical system is a single element precision glass DCX lens. The housing is made of machined aluminum with attractive chrome finish. Magnifier folds flat to fit in your pocket and a genuine leather case is an option. Scale is etched on the inner face of viewer's base (1/8" increments).

Magnification: 9X **Lens Diameter:** 1/2"
Working Distance: 1"
Dimensions (Set-up): 1-1/4"H x 1"W x 1-1/2"L
(Folded): 1/2"H
Scale Graduations: 0 to 1/2" in 1/8" increments

9X Tester Only **E38,323 $17.95**
9X Tester With Leather Case **E38,324 $21.95**

SLIP-CASE FRESNELS / READERS

C) 35 mm PRINT SIZE FRESNEL

Magnifier gives full coverage of a standard 3-1/2" x 5" 35 mm photo print. Slipout vinyl case (4-1/4" x 5-3/4") protects lens. 0.5 mm thick pliable acrylic lens. **Magnification:** 2.5X.
Working Distance: 3-1/2".

35 mm Fresnel **E35,936 $5.75**

D) POCKET SIZE FRESNEL

Handy 1-1/2" x 2-1/2" magnifier comes in a slip-out vinyl case (1-3/4" x 4"). Measuring scales (3 inches & 80 mm) make this a dual-purpose convenience tool. Ideal for phone-book reading. 0.5 mm thick pliable acrylic lens. **Magnification:** 3X. **Working Distance:** 2".

Pocket Size Fresnel **E35,666 $1.95**

E) FULL PAGE MAGNIFIER

Measures 8-1/2" x 11" to cover a full standard sheet of paper and most book pages. Vinyl border acts as a handle to keep fingers off lens surface. Lens is made of pliable 0.5 mm thick acrylic. **Magnification:** 2X.
Working Distance: 8".

Full Page Fresnel **E31,919 $8.75**

F) LARGE MAGNIFYING SHEET

Large 7" x 10" borderless fresnel sheet is ideal for partial coverage of standard 8-1/2" x 11" sheet or full coverage of smaller pages such as invoice size or novel page. Lens is made of flexible 0.6 mm thick acrylic. **Magnification**: 2X; **Working Distance:** 4".

Large Magnifying Sheet **E38,454 $6.50**

INEXPENSIVE LINEN TESTER MAGNIFIERS

Our collapsible pocket magnifiers are an inexpensive version of the classic "Linen Tester." A single DCX lens is mounted in a black plastic housing that folds flat to fit in your pocket. Scales are marked on the base so you can measure the magnified subject.

SPECIFICATIONS:

Magnification:	5X	8X
Lens Diameter:	15/16"	3/4"
Working Distance:	1-3/4"	1-1/2"
Field of View:	1-5/8"	1-3/8"
Dimensions:	2"H x 2"W	1-3/8"H x 1-3/4"W
Standing:	x 1-3/8"L	x 1-1/2"L
Folded:	5/8"H	5/8"H
Stock Number:	E38,682 $3.50	E38,683 $3.50

10-24 Pieces, $3.25 Each
25-99 Pieces, $3.00 Each
100 or More Pieces, $2.75 Each

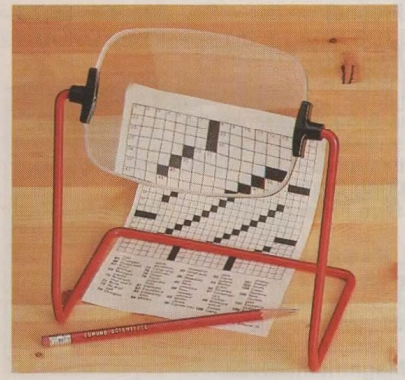
EXTRA LARGE ENGLISH ASPHERIC 2.25X MAGNIFIER

Finally, acrylic technology has made possible a giant 6" L x 4" W magnifier with 2.25X magnification. Ideal for the vision impaired because of its large field of view and outstanding for assembly because of its long working distance under the lens. Lens is made of high-impact lightweight acrylic, precision polished and mounted in a high tech stand. Overall height 6".

SPECIFICATIONS:

Magnification:	2.25X (5 Diopters)
Lens Dimension:	6"Lx4"W
Working Distance:	4-1/2"
Field of View:	9"Lx7"W
Weight:	2 Lbs.

2.25X Magnifier **E36,852** **$195.00**



HANDS FREE MAGNIFIER WITH STAND

Makes reading, writing and working much easier. Safe, break-resistant optical acrylic lens. Gives big 1.75X magnification. Leaves both hands free. Adjusts to any angle. Reduces eye strain. Provides large working area. Lens aperture 5-1/2" x 4". 6-1/2" high. Red metal legs. Equiconvex spherical lens system. 3.0 Diopters. Focal length 10". Use for needlework, crosswords, map reading, computer printouts and miniature work.

Magnification: 1.75X
Lens Dimension: 5-1/2" x 4"
Working Distance: 10" **Field of View:** 8"

Stand Magnifier **E37,165** **$34.95**

5X ASPHERIC STAND MAGNIFIER FOR STAMPS/MAPS

Undistorted clarity. 5X acrylic lens, anti-reflection coated. 2" diameter (50mm) lens. 2" focal length. 20 diopters. Clear base. From Bausch & Lomb.

SPECIFICATIONS:

Magnification:	5X
Lens Diameter:	1-7/8"
Working Distance:	1-5/8"
Field of View:	2"

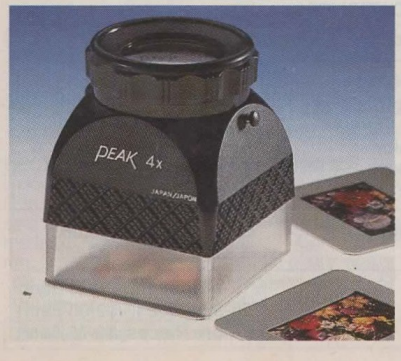
5X Magnifier **E35,664** **$27.95**

SELF-STANDING GOOSENECK 2X MAGNIFIER WITH WEIGHTED BASE

Magnifier stands on its own, freeing your hands to work on the project. Wide field 2X magnification. The 4" diameter optical quality glass lens is mounted in a chrome-plated brass ring. Sturdy two pound weighted base with table-protecting felt bottom. 12" gooseneck lead.

Magnification: 2X
Lens Diameter: 4"
Working Distance: 8"
Field of View: 5"

Self-Standing Magnifier
E70,241 **$29.95**



PEAK PHOTOGRAPHER'S FULL FRAME 4X LOUPE

Ideal for film inspection, wide field design covers full 35mm film frame. Comes with switchable transparent and opaque bases and neckstrap. Smooth helicoid twist focus achromatic lens system. 2.7 oz.

SPECIFICATIONS:

Mfr.'s Stated Power:	4X
Eye Lens Diameter:	1"
Field of View:	1-3/4" x 1-3/4"
Working Distance:	2"
Height Overall:	2-3/4"

4X Loupe **E39,095** **$110.00**

ASPHERIC FLAT WIDE-FIELD STAND MAGNIFIERS

Unique aspheric designs allow distortion-free magnification over an *unusually large field of view.* Made of optical-quality acrylic, these biconvex lenses are mounted in high-impact polystyrene frames which rest directly on the work surface. One of the finest made with hard-to-find, wide-field capability.

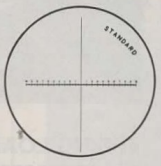
	Rectangular		Circular	
	Large	Small	Large	Small
Lens Aperture	3-3/4"x2-3/4"	2-1/2"x2"	1-3/4" Dia .	1-1/2"Dia.
Power	2.3X	2.7X	5X	7X
Field Of View	3"	2"	1-1/4"	1/2"
Stand Height	3-3/8"	3-3/8"	2"	1-3/4"
Working Distance	2-1/2"	2-1/2"	1-1/4"	1-1/8"
Stock Number	E42,722	E35,331	E35,332	E35,333
Price	$64.95	$34.95	$32.95	$32.95

PEAK FLIP-UP BINOCULAR MAGNIFIER

Unique optical system allows you to view at 2X, 4X or 7X by simply moving hinged extra lenses into place while you view. Comfortable-to-wear unit features a padded head band with adjustable size velcro closure and a flip-up frame so that magnifier can be moved entirely out of the field of view. Shatter resistant acrylic lens for eye protection. View is stereoscopic at 2X and 4X, mono at 7X.

Mfr.'s Stated Power:	2X	4X	7X
Working Distance:	6"	3"	1"

Flip-Up Magnifier **E39,096** **$59.00**



PEAK TELECENTRIC 7X LOUPE WITH SCALE

Special Telecentric Optical System allows you to make precise measurements of both flat objects and three dimensional ones such as small ball bearing without the error caused by parallax. Contact reticle scale is 20mm Long in 0.1mm increments. Eyepiece aperture adjusts to 3mm Dia., 1mm Dia. or 0.5mm Slit. Lens System is 3 elements in two groups. Smooth Twist Focus.

SPECIFICATIONS:

Mfr.'s Stated Power:	7X
Eye Lens Diameter:	3mm MAX
Field of View:	3/4"
Working Distance:	1-1/4"
Height Overall:	3"
Weight:	2.6 oz.

Telecentric 7X Loupe **E39,105** **$175.00**

PEAK 30X LOUPE WITH MEASURING SCALE

High Power Loupe with contact measuring scale 5mm Long in 0.05 increments. Adjustable twist type focus, comes with vinyl case.

SPECIFICATIONS:

Mfr.'s Stated Power:	30X
Eye Lens Diameter:	1/4"
Field of View:	1/8"
Working Distance:	3/16"
Height Overall:	7/8"
Weight:	0.5 oz.
Optical System:	4 Lenses

30X Loupe/Measuring Scale
E39,104 **$119.00**

CONTACT SCALE MEASURING LOUPES

Peak Measuring Loupes come with a removable glass reticle scale which is placed in direct contact with the work to be measured for precise comparison. Available in 7X or 10X magnification. All models feature smooth helicord twist focus and fully coated achromatic lens systems for color correct flat field viewing.

SYSTEM SPECIFICATIONS:

Mfr.'s Stated Power:	7X	10X
Eye Lens Diameter:	3/4"	3/4"
Field of View:	1"	7/8"
Working Distance:	1"	5/8"
Height Overall:	2-1/4"	1-3/4"
Weight:	2.0 oz.	2.6 oz.
Reticle Size:	25mm	35mm Dia.

A. INDIVIDUAL LOUPES WITH LINEAR SCALE

Each loupe features a clear acrylic base, removable reticle ring and a vinyl case plus a crosshair reticle with linear measuring scale.

7X LOUPE AND SCALE
Linear Scale is 20mm Long in 0.1mm increments. **E35,325 $65.00**

10X LOUPE AND SCALE
Linear Scale is 30mm Long in 0.5mm increments (0 - 1mm in 0.1 increments; 1 - 2mm in 0.2mm increments) **E39,102 $95.00**

B. ILLUMINATED SCALE LOUPES

Features same magnifier and scale as systems above but magnifier is built into a flashlight type assembly for illumination. Requires 2 "C" batteries, not included. Each comes with vinyl case, unit measures 7"L x 1-3/8" Dia., weighs 3.5 oz. See above for specifications and scale specifications.

7X Illuminated Scale Loupe E37,391 $90.00
10X Illuminated Scale Loupe E39,100 $135.00

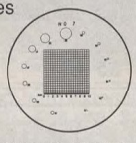
C. LOUPE WITH 5 SCALES SET

Each set comes with 5 individual reticle scales in a hard plastic storage case 6"L x 3"W x 2-1/2"H with foam insert.

7X Loupe With 5 Scales E39,097 $125.00
10X Loupe With 5 Scales E39,098 $175.00

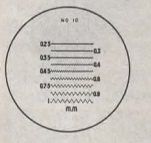
LINEAR SCALE
0 - 20mm in 0.1mm increments

COUNTING GRID
Circles 0.10mm to 2.50mm Dia. Grid 10 x 10mm in 0.10 x 0.10 squares

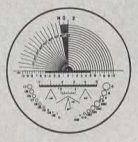


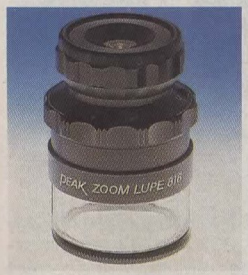
MULTI-SCALE
Linear scale 0 - 20mm, degree scale 0 - 90° in 5°increments; Linear Scale 0 - 0.5 inch, mm holes 0.1 to 1.0, inch holes 1/64, 1/32, 3/64, 1/16, .005 to .050 Linear Scale 0 - 1/8 inch in 1/64 increments, angles 55°, 29°, 60°, 118°.

THREAD SIZE
0.25 to 1.0mm



THICKNESS SCALE
0.02 to 0.16mm in 0.01mm graduations





8X-16X ZOOM LOUPE WITH MEASURING SCALE

Smooth precision zoom mechanism with click stops at 8X, 10X, 12X, 14X, 16X. Features twist style focus and dual contact reticle scale 16mm Long in 1.0mm increments and 0.6 inch Long in 0.005 inch increments. Lens system is 8 elements in 6 groups, fully coated. 5 oz.

SPECIFICATIONS:

Mfr.'s Stated Power:	8X to 16X
Eye Lens Diameter:	3/8"
Field of View:	0.6" to 0.3"
Working Distance:	5/8"
Height Overall:	2-1/2"
Weight:	5 oz.
8X-16X Zoom Loupe	**E39,103 $300.00**

PEAK DIRECT MEASURING MICROSCOPES

- **Lightweight, Only 3 Oz.**
- **Linear Reticle Scale**
- **Available 25X, 50X, 75X, 100X**

Peak's Stand Microscopes are precision instruments for high power measurement of small details. Feature a smooth helicoid twist ring main focus, eyepiece ring adjusts focus for reticle, clear cut-away acrylic stand base and a soft rubber eyecup, unit stands 4-3/4" high, weighs only 3 oz.

SPECIFICATIONS:

Mfr.'s Stated Power:	25X	50X	75X	100X
Field of View:	3.30mm	2.00mm	1.09mm	0.84mm
Working Distance:	17.0mm	11.70mm	11.70mm	11.60mm
Reticle Range:	0-3mm	0-1.6mm	0-1.0mm	0-0.8mm
Graduations:	0.05mm	0.02mm	0.01mm	0.005mm
Item #:	**E39,110**	**E39,111**	**E39,112**	**E39,113**
Price:	**$175.00**	**$195.00**	**$225.00**	**$250.00**

PEAK POCKET MICROSCOPES

- **Bright, Flat Field**

Compact pen style inspection microscopes 5" Long x 1/2" Diameter. Feature precision glass optics, metallic body, pen clip and clear acrylic base. System focuses by tilting the pen at the tip of the clear base. Comes with vinyl case. Each weighs 1/2 oz.

SPECIFICATIONS:

Mfr.'s Stated Power:	25X	50X	75X	100X
Field of View:	3.30mm	2.00mm	1.09mm	0.84mm
Working Distance:	17.25mm	11.92mm	11.80mm	11.80mm
Item #:	**E39,116**	**E39,117**	**E39,118**	**E39,119**
Price:	**$52.00**	**$72.00**	**$88.00**	**$92.00**

TRANSPARENT BASE LOUPES

Clear acrylic base allows light to subject. Features optical glass elements, fixed focus design.

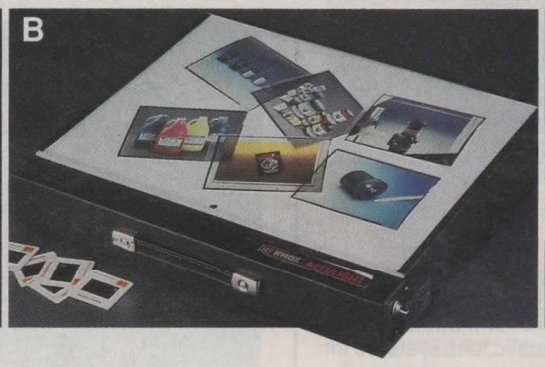
SPECIFICATIONS:

Mfr.'s Stated Power:	5X	10X	15X	22X
Eye Lens Diameter:	1"	7/8"	3/4"	3/4"
Field of View:	1-1/4"	1"	1/2"	1/4"
Working Distance:	2-1/4"	1"	1/2"	1/8"
Height Overall:	2-5/8"	1-5/8"	1-3/8"	1-1/4"
Weight:	0.7 oz.	0.8 oz.	0.5 oz.	0.4 oz.
Optical System:	1 Lens	2 Lenses	3 Lenses	4 Lenses
Item #:	**E39,106**	**E39,107**	**E39,108**	**E39,109**
Price:	**$15.00**	**$22.00**	**$28.00**	**$39.00**

ILLUMINATED MAGNIFIER LOUPES

Illuminated Loupes feature the same optical system as above transparent base loupes but are built into a flashlight type assembly. Require 2 "C" batteries, not included. Weights 3.5 oz., measures 7" Long x 1-3/8" Diameter. See above for magnifier specifications.

10X Illuminated Loupe E39,114 $36.00
15X Illuminated Loupe E39,115 $55.00



A) MODULAR EVENLITE SYSTEM IS THE PROFESSIONAL APPROACH TO SLIDE SORTING AND VIEWING

Easel-style slide sorter and light box feature cool, even light without irritating shadows or hot spots. Back rack aluminum stand supports sorter at a comfortable 60 degree angle. Sorter (17-1/4" x 4-1/4" x 12") has six racks which will handle 42 slides. Spill proof tracks. Light box has large 11-1/4" x 14" flat working area. Convenient trays hold slides while you are working. Weighs just 2.5 pounds.

Viewing System/Slide Sorter
E33,818 $139.00

B) PORTABLE AND LIGHTWEIGHT VIEWING SYSTEM GOES WHERE YOU GO

This Acculight system is designed for those who want a transparency, X-ray or slide viewing system that sets up in a snap anywhere. Mounts easily on a wall. Sets up in seconds on a table. Portable. ANSI standard 5000° 3K light source with CRI rating of 91+. Comes with a 15 watt lamp. 18" x 15" x 4". With carrying handle.

Portable Viewer **E80,294 $185.00**

Desk Top Light Box:
Measures 12-1/2" x 9-1/2" x 2".
E37,326 $69.95

C) CARRY THESE QUALITY TRACING TABLES WITH YOU

Beautifully finished natural birch wood frame tracing tables are ideal for viewing transparencies, slide sorting or ad layout preparation. Opal plexiglass top. Built-in reflectors. Cool fluorescent bulbs. Adjustable legs for tilting. 8 foot grounded cord. Handy carrying handle. On/Off switch.

Small Table: 4" x 11" x 18".
With two 15W bulbs. Weighs 8-1/2 pounds.
Small Table E34,122 $120.00

Medium Table: 4" x 16" x 18".
With two 15W bulbs. Weighs 10-1/2 pounds.
Medium Table E34,123 $149.00

Large Table: 4" x 24" x 18".
With four 20W bulbs. Weighs 16-1/2 pounds.
Large Table E34,124 $220.00

5000° K COLOR CORRECT LIGHT TABLES

For the graphic artist or professional photographer 5000°K color correct illumination is the standard required for critical evaluation. We offer 5000° light tables in a variety of configurations to meet your budget and work requirements.

A) Economy Series: Portable lightweight white vinyl cabinets with glass top and acrylic diffuser, carrying hand, non-skid feet, 8" cord with 3 prong grounded plug..

View Size	Number Of Lamps	Average Lamp Life	Weight	Stock No.	Price
12 x 18"	1-15 watt	7,500 hrs.	10 lbs.	E39,216	$152.00
18 x 24"	2-20 watt	9,000 hrs.	18 lbs.	E39,217	$219.00

B) Professional Series: Furniture quality handcrafted hardwood cabinets with reversible glass top and acrylic diffuser, aluminum straight-edge for use with t-square, adjustable tilt 0-15°, non skid feet, 8" cord with 3 prong grounded plug.

12 x 18"	2-15 watt	7,500 hrs.	10 lbs.	E39,218	$199.00
18 x 24"	2-20 watt	9,000 hrs.	18 lbs.	E39,219	$284.00
18 x 36"	2-30 watt	18,000 hrs.	28 lbs.	E39,220	$334.00

Transparency Clips For The Professional Series:
Package of 8 Clips E39,221 $12.00

C) Deluxe Series: Ultra uniform lighting from 92+CRI rated 5000° lamps housed in a deluxe cabinet handcrafted from select hardwood, glass top with acrylic diffuser, aluminum extrusion edge designed to accept transparencies, adjustable tilt 0-15°, non skid feet, 8"' cord with 3 prong grounded plug.

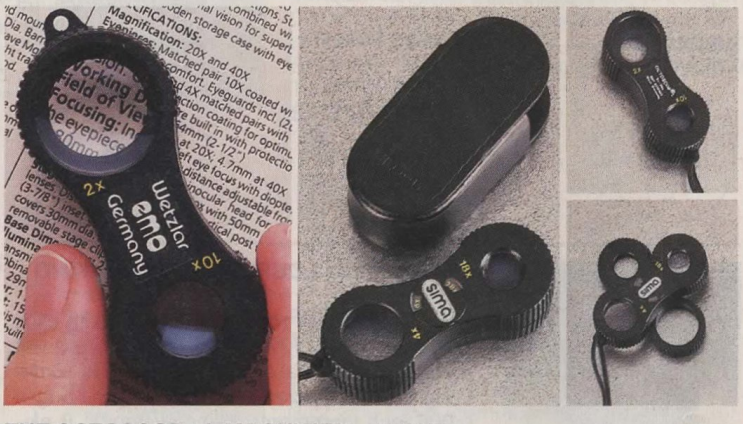
17 x 32"	3-30 watt	18,000 hrs.	35 lbs.	E39,222	$780.00

TRANSPARENT BASE MAGNIFIERS WITH EASY TWIST FOCUS

- **High Magnifications**
- **Fully Coated Optics**
- **Sure Grip Twist Focus**
- **Four Powers**

Our new transparent clear acrylic base magnifiers feature a smooth motion easy twist focusing system for critical adjustment. Designed to provide high magnificatio. Fully coated multi-element lens system provides a color-correct image and a wide, flat field of view. Rests directly on the surface to be inspected. Please note * that as power increases, the field of view decreases; thus, limiting the applications. Comes with vinyl case and protective lens cap.

*SPECIFICATIONS:	10X	15X	20X	30X
Eye Lens Diameter:	1.00"	0.75"	0.60"	0.29"
Field of View:	1-1/4"	3/4"	1/2"	1/8"
Working Distance:	3/4"	1/2"	3/16"	1/8"
Height Overall:	2"	1-1/2"	1-1/2"	1-3/8"
Overall Diameter:	1-5/8"	1-1/2"	1-1/2"	1-1/2"
Weight:	2.5 oz.	1.8 oz.	2.0 oz.	1.8 oz.
Item#:	E38,727	E38,728	E38,729	E38,730
Price:	$75.00	$75.00	$75.00	$75.00



THE OCTOSCOP® L MAGNIFIER. . .EIGHT MAGNIFIERS IN ONE POCKET-SIZE TOOL

Here's the most versatile magnifier we've found. It is really eight magnifiers in one. You can have 2X,4X,6X,10X,14X,18X,20X and28X magnifications simply by turning the two frame wings against each other to get the correct combination. Four color-corrected optical elements, two of which are precision optical cemented achromats. West German instrument is less than 3" long. Comes with leather carrying case and neck strap. Excellent for school, industry and hobby uses. With storage box.

Octoscop®L Pocket Magnifier **E33,115 $145.00**

Illuminated Large Field Extension Arm Magnifiers - 43

Extension arm lamp magnifiers provide an intense concentration of light and a large magnified work area. By the laws of physics, power/magnification will generally be limited to 2X or less (as field increases, power declines). Prices vary based on optical quality (flatness of field and resolution), type of illumination and arm/base construction.

ECONOMY INCANDESCENT LAMP MAGNIFIER

Features a 4-1/2"x2-3/4" oval optical glass lens framed in a styled ABS frame with an integral protective lens cover. Black finish, fully adjustable 3-joint spring-balanced arm with 39" reach, "C" clamp ABS base with max. 2-1/2" opening. Illumination is 60 W incandescent source built into lens hood, 110VAC w/ 7' cord (2 prong), on/off switch.

SPECIFICATIONS:

Magnification: 1.75X/3 Diopter
Working Distance: 10"
Field of View: 9"
Maximum Extension: 39"
Lens Dimension: 4-1/2"x2-3/4"
Illumination: 60W Incandescent

Economy Magnifier Lamp **E31,826** **$69.95**

ECONOMY 5" DIAMETER FLUORESCENT LAMP
• Extra-Long 45" Reach

Features a 5" diameter glass lens mounted in a tough mar-resistant cycolac hood, steel reinforced at neck and back. Oyster white finish, extra-long-reach 3-joint arm with individually calibrated tempered steel springs, "C" clamp (max. 2-1/2" opening) base with built-in lamp transformer and rotatable head. Illumination is energy efficient 22W circular fluorescent lamp with diffuser for cool, shadow-free illumination. 115V AC with 6' cord (3 prong), U.L. listed, on/off switch.

Magnification: 1.75X/3 Diopter
Working Distance: 13"
Max. Extension: 45"
Field of View: 10"

Economy Lamp 5" Dia. **E83,019** **$169.00**

INDUSTRIAL 7.5" DIAMETER FLUORESCENT MAGNIFIER LAMP

Featuring a 7.5" diameter optical quality crown white glass lens mounted in an aluminum hood with medium gray baked epoxy finish. Heavy duty 1/2" steel tube 3-joint extension arm, perfectly balanced in any position, 360° rotatable head, "C" clamp (max. 2-1/2" opening) with built-in lamp transformer. Illumination is energy efficient 32 watt circuline fluorescent lamp for cool, shadow-free illumination. 115V AC with 6 foot cord, 3 prong grounded on/off switch (meets OSHA requirements).

Working Distance: 13" **Field of View:** 12"
Magnification: 1.75X/3 Diopter **Max. Extension:** 36"
Lens Dimension: 7.5" Diameter
Illumination: 32W Fluorescent

7.5" Dia. Magnifier Lamp **E36,711** **$399.00**

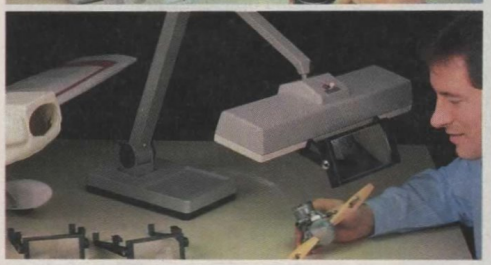
A. WALDMANN "FOCUS 7 PLUS" SYSTEM
• Meets Mil-Std-2000, Dod-2000, WS-6536E
• Complimentary Component System

Key component is the basic extension arm, lamp and magnifier assembly. You then select the desired mount; "C" clamp or self-standing table base. Accessories: two secondary lenses to boost power. Features: a wide field 6.5"x4.25", 3-diopter optical glass magnifier mounted in an ABS frame, a 13 watt compact high efficiency fluorescent lamp and a heavy duty gray steel counter balanced 3-joint am with 37" reach. Head is tiltable and 360° rotatable plus tension is adjustable at all joints. The "C" clamp base has a maximum 2.75" opening and large clamp for support. The self-standing table base.

Magnifier, Lamp & Arm Assembly		
(Requires a Base/Mount)	E38,842	$399.00
"C" Clamp Mount	E38,843	$28.00
Self-Standing Table Base	E38,844	$79.00

SPECIFICATIONS: *Optional Add-On Lenses*

Power:	1.75X/3D	2.75X/7D	4.75X/15D	5X/16D
Working Dis.	13.3"	5.7"	2.7"	2.5"
Field of View:	9"	5"	3"	1.5"
Stock No.:	Included	E38,845	E38,846	E38,847
Price:	With Above	$85.00	$100.00	$100.00



B. Twin Tube Fluorescent Lamp	with Extension	
Arm (Base/Mount Required)	E38,848	$259.00
"C" Clamp Mount	E38,843	$25.00
Self-Standing Table Base	E38,844	$65.00

Optical glass lenses mounted in ABS frames that clip onto the lamp head above.

Optional Clip-On Magnifiers: **2X with 4X Inset*

Magnification:	1.6X/2.5D	2X/4D	2X/4X* -4D/12D
Working Distance:	16"	10"	10"/3.3"
Field of View:	9"	7"	5"/1"
Lens Dimensions:	7.25"x 2.88"	3.63"x 2.0"	3.63"x2.0" /1.25D
Stock No.:	E38,849	E38,850	E38,851
Price:	$120.00	$85.00	$95.00

B. WALDMANN EXTRA-WIDE-FIELD ILLUMINATOR AND MAGNIFIER SYSTEM
• High-Intensity, Low-Glare Fluorescent

An extra-wide-field illuminator with a special parabolic focusing grid is the heart of this flexible system. Add the components you need to customize it to your requirements. Two 15 watt fluorescent lamps are contained in the 18.5" long x 4" wide head, a special parabolic grid concentrates all available light on the work surface while preventing glare. Spring loaded heavy duty 3-joint arms provide 30 inch reach with perfect balance. The head is also 360° rotatable and fully tiltable. Then select the appropriate base; a "C" clamp mount (max 2.75" opening) or a self-standing table top base. Finally select the clip-on magnifier in the magnification desired.

INDUSTRIAL FLUORESCENT "STADIUM VIEW" MAGNIFIERS

Unique stadium shaped lens provides widest field of distortion-free magnification. Dual 7-watt u-shaped fluorescent bulbs, one on each side of the magnifier, can be used individually for 3-dimensional viewing or simultaneously for shadow-free cool illumination. Mounted in a soft-white ABS housing with heavy duty 3-joint K-arm for a complete range of reach and adjustability, perfectly balanced in any position, tempered steel springs. Unique neck allows head to swivel from side to side. Available with 30" or 45" reach arm, plus secondary snap on lenses are available to increase power. Comes with 6-3/4"x4-1/2" primary 3 diopter lens. 110V AC with 6 foot, 3 prong grounded cord, U.L. listed.

Magnifier with 45" reach arm and "C" clamp base (edge mount)	E37,742	$295.00
Magnifier with 30" reach arm and weighted table-top mount	E37,743	$385.00

SPECIFICATIONS: *Lenses/Magnifiers*

	PRIMARY/OPTIONAL/SECONDARY		
Magnification:	1.75X/3 D	2.75X/7D	3.75X/11D
Working Distance:	13"	5.5"	3.5"
Field of View:	6.75"	4.0"	3.125"
Stock No.:	Included	E38,418	E38,417
Price:	With Above	$37.00	$44.00

ILLUMINATING MAGNIFIER WITH STEEL ROD STAND

Versatile tool permits both hand-held and hands-free use in industry, schools, office and laboratory. Both the lens and the included seven watt bulb are adjustable. With the lens tilted, hand-held objects can be viewed, worked on or inspected. With the lens parallel to the work surface, anything laid beneath it is in focus. Optical quality, scratch-resistant glass lens.

Magnification: 2X **Lens Size:** 2"x4"
Working Distance: 4-1/2" **Field of View:** 7"

Lamp: 7 watt, 115V. 5', non-grounded cord. Plastic sleeves on the feet protect even highly finished working surfaces. Lens mount and lamp housing are gray plastic. American-made. Steel Rod Stand.

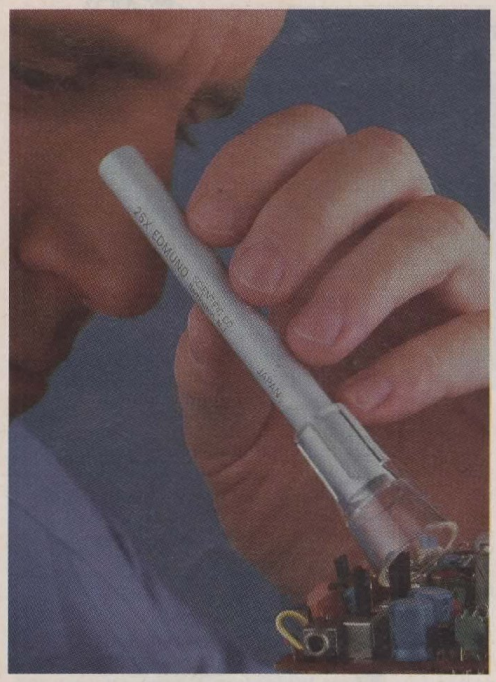
Illuminated Stand Magnifier **E61,213** **$35.95**

MIL-STD INDUSTRIAL 4X FLUORESCENT MAGNIFIER

A critical inspection magnifier designed to meet Mil-Std:S-45743E, Dod-STD-2000-1-B, and WS-6536E. Features a compound binocular multi-element lens system for 4X magnification. Mounted in a molded ABS housing with dual 7 watt side illumination bulbs which can be used individually or simultaneously for shadow-free illumination. Heavy duty 3-joint K-arm with 30" reach and heavy weighted table-top mount. Perfectly balanced in any position, tempered steel springs. 110V AC with 6 foot, 3 prong grounded cord, U.L. listed.

Field of View: 4.25" **Magnification:** 5X/16 Diopters
Working Distance: 2.5" **Lens Dimension:** 3/4" Dia.

4X Magnifier Lamp **E38,841** **$799.00**



EDMUND'S OWN PRECISION POCKET MICROSCOPES

- **Available in 25X or 50X Magnification**
- **Precision Ground Lens System**
- **Rugged Brushed Aluminum Body**
- **Clear Acrylic Easy-Focus Base**
- **Fits In Your Pocket Like A Pen**

Carry this microscope like a pen. It is only 5" long and has a brushed aluminum finish. Precision glass lens system provides distortion-free detail inspection. Clear plastic mount admits light to subject under view and holds scope at proper focus. Invaluable for the engineer, tool maker, inspector, laboratory technician, researcher, collector and hobbyist. Our pocket microscope makes a wonderful gift for anyone and is reasonable enough in price that you can outfit your entire staff or class.

Magnification Power	Item Number	Regular Price	6-23 Pieces	24-49 Pieces	50 or More
25X	E31,853	$14.00	$11.00 Ea.	$9.25 Ea.	$8.25 Ea.
50X	E34,609	15.00	12.00 Ea.	10.25 Ea.	9.25 Ea.

Fabric shown at increasing magnification power:

(A) OUR OWN ZOOM FIELD MICROSCOPE

- **20X, 40X, 60X Magnification**
- **Compact 4-1/4"L x 1-1/2"W x 3/4"T**

Our compact field microscope travels with you anywhere. Designed to give you the versatility of different magnifications in the field; microscope also has many applications in the shop or lab. It can stand on its base or be held up to the light; stage clips secure the slide or specimen. Screw thread, fine-focus system. Coated optics. 6 oz. Height: 5 to 6-1/2". All metal construction.

Field Microscope **E31,310 $67.00**

(B) ZOOM 20X, 40X, 60X SHIRT POCKET PEN MICROSCOPE

- **Compact 4-3/4"L x 5.8" Diameter**

The versatility of three powers in one compact instrument. Precision glass optics provide a wide flat field of view. Objective end has a highly reflective concave surface to focus light on the subject. 1.25 oz. Height: 5 to 6-1/2". All metal body.

Pen Microscope **E31,309 $52.00**

SPECIFICATIONS FOR (A) AND (B):
Magnification: 20X, 40X, 60X
Eye Lens Diameter: 5/16" (0.8mm)
Field Of View: 20X - 4.4mm; 40X - 2.5mm; 60X - 2mm
Working Distance: 20X - 30mm; 40X -25mm; 60X - 22mm

OUR OWN HIGH QUALITY MICRO-TEL PENSCOPE 50X POCKET MICROSCOPE, 10X TELESCOPE

- **Precision Optical Glass Lenses • Rugged Aluminum Body**
- **Dual Purpose /Always Be Prepared**
- **Fits In Your Pocket Like A Pen**

Used as a microscope, our penscope magnifies fine details 50X. Clear acrylic tip allows light in and lets you rest directly on the object. Draw out the chrome-finish focus tube and you have a 10X telescope to spy on distant objects. Carry it in your pocket like a pen and always be prepared for any inspection requirement. Measures 5/8" diameter, 5" long (8-3/8" extended). Our exclusive version of the Micro-Tel features high quality components. The lenses are precision ground glass elements and the housing is all metal construction. This dual purpose instrument makes an ideal gift for a technically-oriented adult and is rugged enough to be a long-lived educational toy.

Micro-Tel Penscope **E36,118 $19.95**

EDMUND 10 X 30 MONOCULAR/ 45X FIELD MICROSCOPE

- **Extra-Close Focus Capability**

This precision roof prism 10X30 monocular becomes a 45X microscope when you attach the micro lens and clear acrylic stand. Features fully-coated achromatic optics, smooth twist focus and carrying case. As a monocular (erect true image telescope) it focuses from infinity to 28" close focus. At close focus, it is technically a long distance magnifier which has many industrial applications (in-process inspection). Weighs 8.2 oz. Height: 6", 9.25"(45X).

	Microscope 45X	Monocular 10X
Magnifcation:		
Field of View:	6.3mm	6° 2.5"at 28" 325' at 1,000 yds.
Working Dist:	65mm	28" to infinity
Objective Lens	N.A.	30mm Dia.
Exit Pupil:	N.A.	3mm
Brightness:	N.A.	9

Microscope/Monocular **E38,698 $170.00**

EDMUND'S DELUXE 50X POCKET MICROSCOPES

The ultimate in compact microscopes features precision, fully-coated optics, rugged anodized aluminum body and clear acrylic base. It rests directly on the subject for stability and focuses with a very smooth ring movement. Comes with molded case 5-3/4"L x 2-3/8"W x 2"H and cushion inserts.

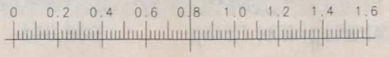
Magnification: 50X **Field of View:** 2mm
Working Distance: 3/8" **Height:** 4"
Weight: 2 oz. **Diameter (base):** 1-1/4"

50X Microscope **E42,693 $170.00**

50X WITH MEASURING SCALE

Same microscope as above with 0 to 1.6mm in 0.02mm increments measuring scale. Diopter adjustable eyepiece to focus scale independent of system.

50X With Scale **E36,291 $190.00**



EDMUND SCIENTIFIC ILLUMINATED 30X POCKET MICROSCOPE

• Our Most Popular Educational Hand-Held Microscope

Our new design updates and improves this very popular microscope. It is the perfect carry-with-you-everywhere microscope. Ideal for industrial inspections, educational field trips and hobby applications. Microscope measures 5-1/8" long x 1-3/8" wide x 3/4" thick. Powered by two "AA" batteries (not included). Features a clear acrylic base, on/off switch and side focus knob.

SPECIFICATIONS:

Magnification: 30X **Field of View:** 3/16"
Dimensions: 5-1/8" L x 1-3/8" W x 3/4" T
Working Distance: 3/4"
Weight: 2.5 ozs. (with batteries)

30X Pocket Microscope	**E35,001**	**$9.50**
3 or more, $7.50 each		
Extra Bulb	**E34,190**	**$2.95**

DIRECT MEASUREMENT MICROSCOPES FOR CLOSE EXAMINATIONS

Powerful direct measuring scopes are no larger than a fountain pen. Available in your choice of a measuring glass reticle in metric or inch scales. Can be purchased with or without optical clear plastic base. Stands only 4-1/4" high and weighs two ounces. 50X for quick, close examinations to detect flaws or imperfections, make surface measurements or examine fibers or printing. Base (1-1/2" O.D.) converts the unit to a free standing microscope that can be focused and locked. The inch reticle length is 1/10" with 0.001" divisions. The millimeter reticle length is 2.5mm with divisions of .02mm. Made exclusively for Edmund Scientific.

SPECIFICATIONS:

Magnification: 50X **Eye Lens Diameter:** 5/16"
Height: 4-1/4" without base. 4-1/2" with base.
Weight: 1 oz. without base. 2 ozs. with base.
Field of View: 3mm **Working Distance:** 20mm

Pocket Scope (inches)	**E30,225**	**$44.00**
Scope And Base (inches)	**E60,465**	**$54.00**
Pocket Scope (mm)	**E42,215**	**$44.00**
Scope And Base (mm)	**E61,210**	**$54.00**
Pocket Scope Without Reticle	**E30,013**	**$38.00**

**INCH RETICLE* *You make direct readings from reticle; no calculations necessary.*

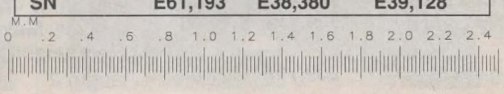
DELUXE ILLUMINATED DIRECT MEASURING MICROSCOPES

• 100X, 60X, 40X Models • Inch/Metric Reticle

For quick and precise measurements in laboratories, workshops and assembly lines. Features a dual scale reticle graduated in both inches and millimeters. A turn of the eyepiece brings the reticle into sharp focus. Vertical adjustment knob sharpens the subject image. Includes a fully adjustable—raised or lowered—battery operated penlight illuminator, which can be removed for use elsewhere. Scope has cutaway opening at base for subject manipulation.

Illumination: Adjustable & removable, battery operated
Stage Size: 51mm dia. with 10mm dia. center hole
Focusing: Rack and pinion
Weight: 1.1 pounds **Height:** 8-1/2"

Mag.	100X	60X	40X
Field	1.4mm	3.25mm	4.25mm
Work. Dist.	5.5mm	23.9mm	23.9mm
Reticle	0 to 0.050"	0 to 0.10"	0 to 0.10"
	0 to 1.0mm	0 to 2.4mm	0 to 3.0mm
Grad.	0.001"	0.001"	0.001"
	0.010mm	0.020mm	0.020mm
Price	$265.00	$265.00	$265.00
SN	E61,193	E38,380	E39,128



30X POCKET MICROSCOPE

• Precise Screw Focus

Designed for the aircraft industry, our 30X pocket microscope features a precision glass lens system mounted in a black anodized aluminum cell with clear acrylic base. The system features a fine-thread screw focusing with lock ring so that the instrument can be set for your eye and then used for repeated inspections without readjustment. Measures 5-1/4" L. x 3/4" dia. (max.).

SPECIFICATIONS:

Magnification: 30X
Field of View: 3 mm
Eye Lens Diameter: 12 mm

30X Microscope E38,642 $27.95

DELUXE DIRECT MEASURING POCKET MICROSCOPES

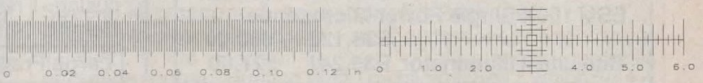
• Inch or Metric Models
• Extra Wide Field Eyepiece

An extra fine instrument for critical inspection and direct measurement with a precision built-in reticle. Our Deluxe Direct Measuring Microscope features a larger 1" diameter eyepiece assembly, a "human factors" design to allow for easier handling and fast precise focusing. The extra wide field eyepiece provides a 5/32" (3.75 mm) field of view, almost 20% wider than comparable pocket microscopes. The eyepiece has a fine thread screw focus for precise adjustment and an additional knurled ring allows you to rotate the reticle without moving the instrument. The 3/8" chrome shaft and 5/8" dia. acrylic base (removable) will fit into tight spaces. Available in either Inch scale or Metric scale models.

SPECIFICATIONS:

Magnification: 30X
Field of View: 3.75 mm/5/32"
Working Distance: 30 mm/1-3/16" **Image:** Inverted
Base Diameter: 15 mm/5/8" **Weight:** 2.9 ozs.
Shaft Diameter: 11 mm/3/8" **Height:** 170 mm/6-3/4"
Eyepiece Diameter: 25mm/1"
Reticles: 90 Degree Crossline with divisional markings

INCH	METRIC
Range: 0 to 0.12"	**Range:** 0 to 3 mm
Increments: 0.001"	**Increments:** 0.05mm
E38,426 $130.00	**E38,427 $130.00**



B. TRUE ERECT IMAGE 15X DIRECT MEASURING MICROSCOPES

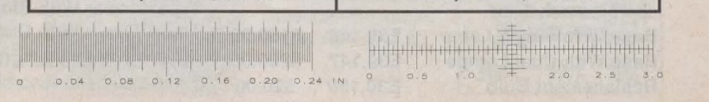
• Inch or Metric Reticle • Erect Image Viewing

Similar to our 30X models above, these new 15X models feature a true erect image and a more compact design. The shaft is shorter and the overall diameter of the eyepiece assembly is smaller.

SPECIFICATIONS:

Magnification: 15X **Field of View:** 7mm/9/32"
Working Distance: 30mm/1-3/16" **Weight:** 1.20z.
Base Diameter: 15mm/5/8" **Shaft Diameter:** 11mm/3/8"
Eyepiece Diameter: 21mm/7/8" **Height:** 140mm/5-1/2"
Reticle: 90° Crossline with divisional markings

INCH	METRIC
Range: 0 to 0.24"	**Range:** 0 to 6mm
Increments: 0.0025"	**Increments:** 0.10mm
E38,696 $140.00	**E38,697 $140.00**



LEICA ACADEMIC ESM MICROSCOPES

- **High Quality Glass Optics (Coated Achromats)**
- **High Resolution, 350 Lines/mm at 100X**
- **Economically Priced**

This instrument was developed in collaboration with science teaching organizations. The ESM Microscope is tamper-proof with non-removable parts and a shock-resistant, reagent-resistant stand. A permanently attached, reversible mirror, concave on one side and a white diffusion surface on the other, directs natural light. An all glass optical system comparable to more expensive instruments for higher grade levels. The ESM 100X microscope has a fixed magnification of 100X. The dual power ESM 25/100X microscope allows a close-up view of the specimen using the 25X magnification. For 100X just push the eyepiece tube to the 100X position. Both instruments can be utilized without the use of specimen slides due to a built-in glass stage plate. Includes 36 page instruction manual.

SPECIFICATIONS:
Magnification: 25X and 100X
Working Distance: 25X - 15.7 mm; 100X - 6.6 mm
Field of View: 25X - 4.5 mm; 100X - 1.1 mm
Illumination: Large, adjustable concave mirror, reversible with white diffusion surface.
Stage: 65 mm x 82 mm with clips and glass stage plate.
Focusing: Simple, one-step rotatable eyepiece tube
Weight: 0.45 kg

ESM 25X/100X Dual Power Microscope	**E38,121**	**$41.95**
ESM 100X Single Power Microscope	**E38,122**	**$30.00**
Rite Lite II Illuminator	**E35,241**	**$27.00**

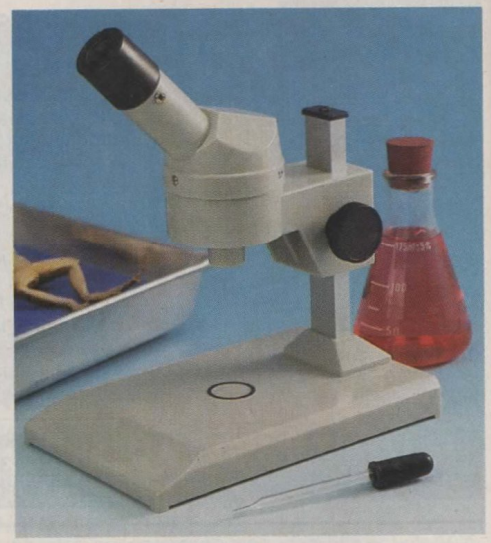
LARGE 14.5" TALL LAB MICROSCOPE

- **International Standard Eyepiece & Objectives**
- **Economical Price, High Quality**
- **Made in China**

ES is pleased to offer this heavy duty traditional style laboratory microscope manufactured in Mainland China. Construction specifications are to international standard DIN, optical quality is excellent and mechanical movements are smooth and precise . . . this is a true bargain. Features inclinable body, DIN objectives and eyepiece, fully coated achromatic optics, security lock on eyepiece and stage clips, color coded objectives and rack stop resolution; centering and parfocal features all perform excellently. Baked black enamel finish.

SPECIFICATIONS:
Magnification: 40X - 100X - 400X
Objectives: 4X and 10X achromatic, 40X spring loaded (21mm Std.)
Eyepieces: 10X WF (23mm Std.)
Working Distance: 4X - 22.0mm; 10X - 8.5mm; 40X - 1.5mm
Field of View: 4X - 4.50mm; 10X - 1.75mm; 40X - 0.45mm
System Length: 205mm
Tube Length: 160mm
Illumination: 50mm Dia. planar/plano-concave mirror on gimbal mount, bright field condensor (NA 130), 5 position diaphragm 3.5mm, 5.5mm, 8.0mm, 10.0mm, 14.0mm
Stage Size: 115mm x 125mm with two clips
Focusing: Rack and pinion coarse and fine focusing. 1 revolution = 0.020mm.
Height: 14.5" **Weight:** 8 lbs.

Large Frame Microscope	**E39,080**	**$250.00**



SCHOOL GRADE 20X MICROSCOPE

- **Dissecting/Biology/Earth Science**
- **True Erect Image**
- **Comfortable 45° Viewing Angle**

Designed to withstand the rigors of the classroom environment and to provide excellent flat field, color correct optical performance. Features high quality achromatic glass optics mounted in a rugged high-impact-resistant ABS plastic (telephone grade) body. Microscope head is mounted on a large platform base with aluminum pole, smooth friction focus system. Eyepiece and objective are locked in place to prevent tampering. Ideal microscope for dissecting experiments with plenty of room for work and instruments.

SPECIFICATIONS:
Magnification: 20X
Eyepiece: 10X Wide Field
Objective: 2X
Field of View: 5/16" (8mm)
Working Distance: 2-5/8" (67mm)
Stage Size: 4-1/2"W x 7"L (116mm x 177mm)
Focusing: Friction Roller/65mm Travel
Maximum Height of Object: 1" (26mm)
Overall Height: 8-3/8" (212mm)
Weight: 2 lbs.

20X Microscope	**E39,135**	**$175.00**

Table Top Base Models
Base measures 5-3/4" Dia. x 5" High, transformer built within base, flexible arm is 11" Long, weighs approximately 5 lbs.

Base With Single Lamp	**E39,146**	**$150.00**
Base With Dual Lamps	**E39,147**	**$200.00**
Replacement Bulb	**E39,150**	**$20.00**

HIGH INTENSITY MICROSCOPE ILLUMINATORS

- **12,500 Foot Candles / 3000° K**
- **10,000 Hours Average Bulb Life**

Controlled high intensity quartz halogen illumination is the key feature of Dyna-Lume's® series of microscope and workspace illuminators. Electronic intensity control knob varies output of a prefocused 1" diameter field miniature quartz halogen bulb mounted in a ventilated anodized aluminum projector head. The entire lamp assembly is mounted on an all-angle swivel at the end of a chrome coil flexible arm. On/off switch with neon indicator, 5 foot polarized 120V AC main power cord and instructions. Available in table top or clip-on base and with single or dual lamp heads.

Clip-On Base Models
Clamp jaws are 3" Long with maximum 1-1/2" opening, flexible arm is 8" Long, remote transformer 4"L x 3"W x 2-3/4"H, 5" low voltage (Lamp to Transformer).

Transformer With Single Clip Lamp	**E39,148**	**$135.00**
Transformer With Dual Clip Lamps	**E39,149**	**$185.00**

HEAT SHIELD FILTER
Tempered heat-absorbing glass filter. **E39,151** **$25.00**

ALLIGATOR JAW SPECIMEN POSITIONER

- **Three Way Axis**

An ideal specimen positioner for holding small objects such as gems, electronic components, ball bearings, etc. in the field of view of stereo or inspection microscopes. Made of non-reflective flat black, glass-filled nylon; the serrated jaws firmly clamp specimens without reflection interference in the field of view. Unit easily mounts to spring clamp holes in microscope base (comes with 3mm, 4mm, 5mm base pins) or may be glued in place. Maximum jaw opening 15mm/9/16", pedestal height 1-1/4":, horizontal shaft 2-1/2" L., jaw length 2". **E39,136** **$34.95**

MICROSCOPE BUYERS' GUIDE

What makes one microscope better than another?

Construction: Stand, tube and mechanical parts should be made of metal; avoid plastic, which cannot maintain precision alignment required.

Objectives: Insist on precision glass optics, quality improves with achromats and anti-reflection coatings. Spring loaded is best for higher powers.

Eyepiece: 10X eyepiece is standard supply, wide-field (W.F.), 5X & 15X are for specialized applications. Focusing eyepieces are required only for measuring reticles.

Stage: The platform that holds your specimen slides should be sturdy metal with spring holding clips. Better scopes accept a mechanical stage for precision grid movement.

Focusing: Rack and pinion is required, over 300X fine and coarse controls are necessary. Parfocal ability (no need to refocus changing powers) found on top-quality microscopes.

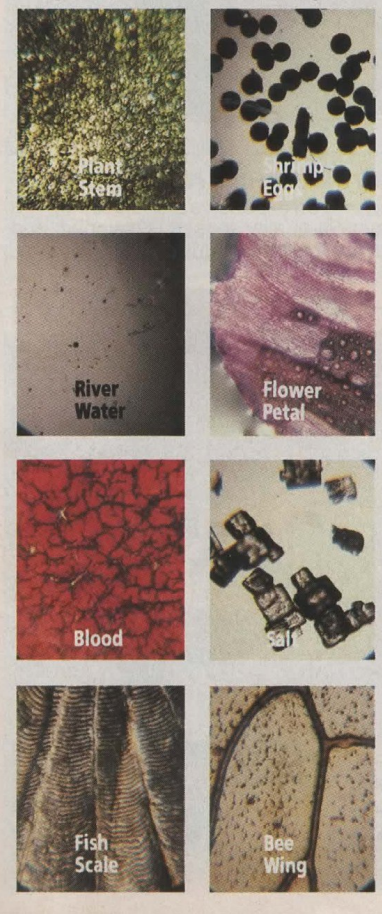
Substage Equipment: Plano-concave mirror to concentrate and direct independent light source or built-in illuminator. Diaphragms, filters and condenser lenses found on sophisticated microscopes

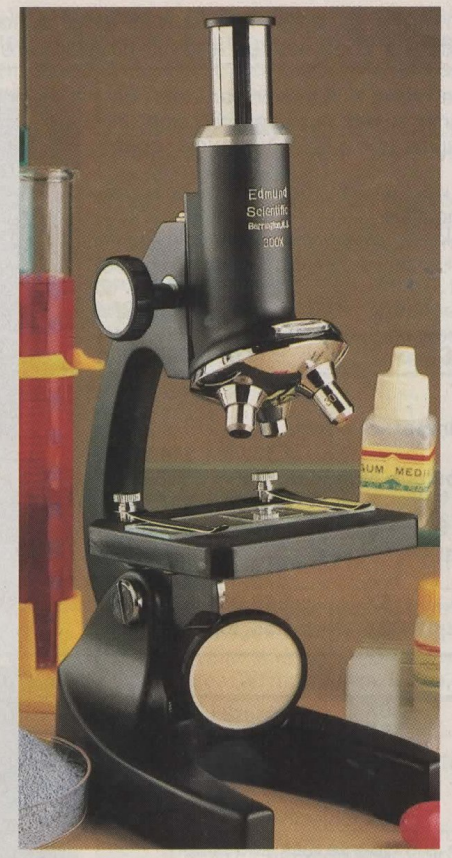
ES designs its own microscopes and imports them directly, avoiding importer and distributor mark-ups. You will not find a better value in quality, durability and performance for the price anywhere in the U.S.A.

Why every boy/girl should own a microscope:

Megatrends reports that biology is now the No.1 science in the U.S. Economy. The knowledge and pleasure gained from home microscope study could launch your child into a very productive career in this growing field.

Specimens photographed at low power under a microscope:





OUR SCHOOL GRADE 300X MICROSCOPE IS NOT A TOY...*PRICED FOR BEGINNERS. *RUGGED METAL FRAME WITHSTANDS CLASSROOM USE AND ABUSE

- **Carrying Case**
- **Complete With Accessories**
- **Precision Glass Optics**
- **Metal Body Construction**

Powerful 300X all-metal-construction microscope will open hidden worlds to budding scientists. Black lacquer-finish body. One-piece, triple-revolving turret achromatic objectives. Fully coated optics for years of use. Smooth, rapid focusing adjustments.

Microscope set includes these accessories: shrimp egg hatchery with eggs and sea salt; one prepared slide, five blank slides and glass covers; three color cones; pipette; dissecting kit with scissors, needle, spatula, knife and tweezers; Canadian balsam; methylene blue; magnifier; butterfly specimen; fiber and feather; carrying case.

SPECIFICATIONS:

Magnification: 50X, 100X, 300X
Objectives: 5X, 10X and 30X achromats Eyepiece: 10X*
Working Distance: 50X-10.5mm; 100X-7.5mm; 300X-3.3mm
Field of View: 50X-2.9mm; 100X-1.3mm; 300X-0.45mm
Illumination: 1-3/8" dia. plano adjustable substage mirror
Stage Size: 2-7/8"x 3-1/8" with 3/8" diameter center hole and holding clips.
Focusing: Rack and pinion
Weight: 3.52 lbs. with carrying case. **Height:** 9-1/4"
***Note:** Eyepiece and objectives are built in and are not interchangeable.

School Grade Microscope **E34,496 $115.00**

School Grade Microscope and copy of our popular basic reference source "Hunting With The Microscope." 125 pages; paperback. **E34,497 $119.00**

Illuminator for Microscope. See page 54 for complete description. **E39,060 $14.95**

THE EDMUND 300X STUDENT MICROSCOPE

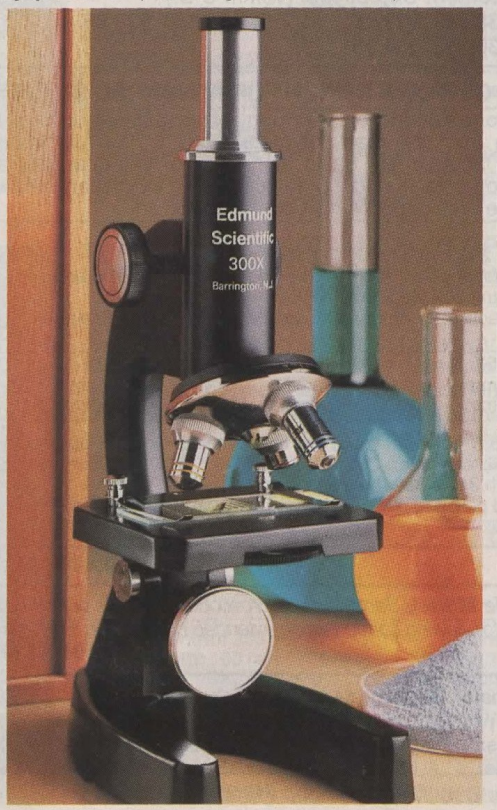
•The Model Most Frequently Specified By Educators

• **Deluxe Wooden Case** •**Precision Glass Optics** •**Achromatic Objectives** •**All Metal Construction**

Here is a professional instrument priced within anyone's budget. Quality optics for a precise, clear view. All-metal construction will withstand years of rugged use in school, lab or home. Arm inclines for easy viewing. 50X is perfect for examining insects and small specimens. 150X is well-suited for identifying minute features. 300X is powerful enough to see many bacteria. An excellent basic scientific tool which is dependable and reliable. Handy wooden storage case.

SPECIFICATIONS:

Magnification: 50X, 150X, 300X **Objectives:** 5X, 15X, 30X color-corrected achromatic objectives, turret mounted. Eliminates color aberrations usually associated with budget-priced microscopes. (15mm accessory objective is interchangeable).
Eyepiece: 10X (interchangeable, 19mm O.D.).



Working Distance: 50X-11.7mm; 150X-3.0mm; 300X-0.8mm
Field of View: 50X-2.55mm; 150X-1.05mm; 300X-0.47mm
Illumination: 1-3/8" plano and concave adjustable substage mirror with clickstop adjustable diaphragms (1-4.5mm diameter, 1-7mm diameter, 4-10mm diameter) for mounting filter from 11mm to 13.5mm diameter.
Stage Size: 3" x 3-1/2" with 3/8" center hole and clips.
Focusing: Rack and pinion **Tube Length:** 139mm
Weight: 2 lbs. **Height:** 10"

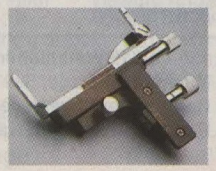
300X Microscope & Case **E70,008 $129.00**

Six or More Microscopes **$119.00 Each**

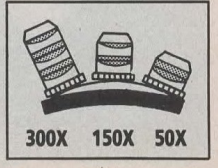
Special Microscope & Accessory Kit Package:
Includes microscope and all the basic accessories needed to get involved in the fascinating world of microscopy: our basic reference source, "Hunting With The Microscope," which details how a microscope works, what items should be looked at in close detail, how to prepare and care for a slide and more; prepared slides; well slide; cover glass; slide kit; stains and instructions.
Scope/Accessories/Book **E72,445 $159.00**

ACCESSORIES:

A) "Hunting With The Microscope." 125 page paperback. **E9207 $4.95**
B) Stand Illuminator. See page 54. **E39,060 $14.95**
C) Plug-In Substage Illuminator. See page 54. **E50,222 $57.95**
D) Increase the Power of this Microscope to 500X. Our 50X accessory objective lens screws into the rotating turret of 70,008 microscope to give you 500X magnification. (50X obj. x 10X eyepiece = 500X). 15mm O.D. **Objective Lens** **E37,387 $24.95**



Microscope Stage. Sturdy, attachable graduated mechanical stage. **E31,954 $42.95**



All microscopes in this series are built to demanding educational standards. They are ideal for schools or industry and will provide many years of service. Repair service, replacement eyepieces, and objectives and illuminators are available.

EDMUND STUDENT 450X ZOOM MICROSCOPE

- **100 to 450X Magnification Range**
- **Three Turret-Mounted Objectives**
- **10 to 15X Zoom Eyepiece**
- **All Metal Construction**

A sturdily-built microscope designed for educational use with unique zoom eyepiece feature. Explore overall structure of specimens at low power and zoom in for high power detail examination. Features adjustable inclination, focus stop to protect slides, adjustable sub-stage diaphragm, spring clips, fully coated optics and hardwood carrying case.**SPECIFICATIONS**:

Magnification: 100X to 450X
Objectives: 10X, 15X, 30X Achromatic turret mounted, 15mm dia. interchangeable
Eyepiece: 10-15X Zoom. Not removable
Working Distance: 5mm with 10X, 3mm with 15X, 1mm with 30X objective

Field of View:	Objective:
1mm-100X; .6mm-150X	10X
.8mm-150X; .5mm-225X	15X
.3mm-300X; .2mm-450X	30X

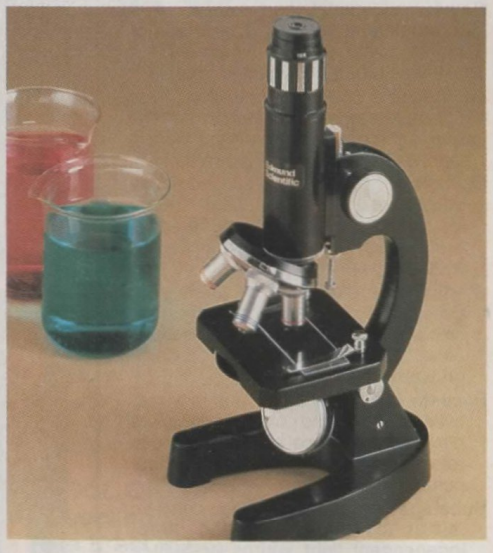
Illumination: Revolving 1" diameter plano and concave substage mirror with substage clickstop adjustable diaphragms (4.5,5,6,7,8,10mm dia. openings).
Stage Size: 3" x 3-1/2" with 10mm center hole and removable spring clips.
Focusing: Rack and pinion with adjustable focus stop.
Tube Length: 137mm
Weight: 2.34 pounds **Height:** 10-1/2"

Microscope & Case	**E38,071**	**$220.00**

Accessories:

A) Stand Illuminator: *See page 54.* **E30,060 $14.95**
B) Plug-in Substage Illuminator **E50,222 $57.95**
C) Mechanical Stage **E31,954 $42.95**
D) Replacement Objectives:

	10X	**E38,349**	**$29.95**
(15 mm O.D.)	**15X**	**E38,350**	**$29.95**
	30X	**E38,352**	**$29.95**



EDMUND DELUXE 600X MICROSCOPE

- **100X to 600X Magnification Range**
- **Three Turret-Mounted Achromatic Objectives**
- **Fine/Coarse Rack and Pinion Focusing**

Medium duty microscope offers a larger 3" stage and broader base than comparable scopes. Built for repeated "hands-on" use in classroom or industry. Weighs a hefty 2.6 pounds. Full-feature monocular design. All metal construction. Fully coated optics. Features: adjustable inclination, focus stop for slide protection, spring clips and hardwood storage and carrying case.
SPECIFICATIONS:
Magnification: 100X, 150X, 225X, 400X, 600X
Objectives: 10X, 15X, 40X achromatic turret-mounted. 15mm interchangeable.
Eyepiece: Interchangeable WF 10X and WF 15X. 19mm O.D.
Working Distance: 7.5mm with 10X objective; 3mm with 15X objective; 0.8mm with 40X objective.
Illumination: Revolving 1-3/8" diameter plano and concave substage mirror with substage clickstop. Adjustable diaphragms (4.5,5,6,7,8,10mm dia.)
Stage Size: 3-1/2" x 3" with 10mm center hole.

Field of View:

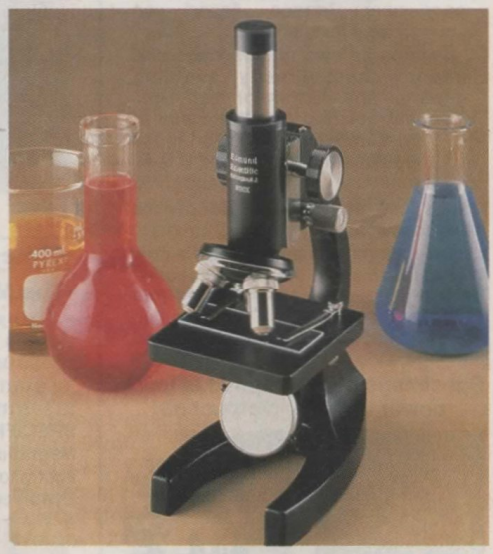
10X Eyepiece:	10X Objective	1.35mm
	15X Objective	1.0mm
	40X Objective	0.35mm
15X Eyepiece:	10X Objective	0.90mm
	15X Objective	0.75mm
	40X Objective	0.25mm

Focusing: Fine and Coarse rack and pinion.
Tube Length: 139mm
Weight: 2.6 pounds **Height:** 11"

Microscope & Case	**E72,406**	**$249.00**

ACCESSORIES:

A) Stand Illuminator. *See pg. 54.* **E39,060 $14.95**
B) Plug-In Substage Illuminator. See page 49. **E50,222 $57.95**
C) Mechanical Stage: X/Y Axis movement for precision slide positioning. **E31,954 $42.95**
D) Replacement Eyepieces: (19mm O.D.)
WF10X **E38,355 $19.95** WF15X **E38,356 $20.95**
E) Replacement Objectives: (15mm O.D.)
10X **E38,349 $29.95** 15X **E38,350 $29.95**
40X **E38,353 $34.95**



A TRULY USABLE 1000X MICROSCOPE FOR ONLY $329. OUR OWN DESIGN FOR ADVANCED STUDIES AND INDUSTRIAL APPLICATIONS

- **50X to 1,000X Magnification**
- **Rugged All Metal Construction**

Priced within nearly everyone's budget but with many of the features normally found only on expensive models. Designed for years of rugged use from the black all-metal body to the fully-coated, optical-quality lenses. Designed and recommended for small laboratories, basic medical use, veterinarians, advanced biology, industrial applications, contamination and pollution studies and more. Includes an inclination joint and focus stop to prevent slide breakage. With wooden storage case.

SPECIFICATIONS:
Magnification: 50X, 100X, 200X, 400X, 500X, 1,000X
Objectives: 5X, 20X, 50X (springload). Achromatic objectives. 17mm is interchangeable.
Eyepiece: Wide field 10X and 20X. 19.75mm.
Working Distance: 5X objective: 11.6mm; 20X objective: 3.8mm; 50X objective: 0.7mm

Field of View:

Objective	5X	20X	50X
10X Eyepiece	3.0mm	0.8mm	0.34mm
20X Eyepiece	1.5mm	0.4mm	0.17mm

Illumination: Revolving 1-5/8" diameter plano and concave substage adjustable mirror. Substage has adjustable clickstop apertures: 5.0, 5.5, 7.0, 8.5, 10.0, 12.0mm diameters.
Stage Size: 3-3/4" x 4" with 3/8" center hole and spring clips.
Focusing: Helical rack and pinion, dual fine & coarse. **Tube Length:** 139mm
Weight: 6-1/2 lbs. with case. **Height:** 11"

1000X Microscope	**E34,498**	**$329.00**

New 45° Viewing Angle Model. *Same basic microscope as above, but with eyepiece tube on a 45° angle for viewing comfort when extended observation is required. (Shown at right).* **E36,101 $349.00**

A) 120 Volt 15 Watt Illuminator. See page 54 for details. **E50,222 $57.95**
B) Mechanical Stage. See page 54. **E30,058 $139.00**
C) Replacement Eyepieces:(21 mm) WF10X **E38,644 $20.95;** WF20X **E38,645 $22.95**
D) Replacement Objectives: 5X **E38,408 $21.95** 20X **E38,409 $29.95**
50X **E38,410 $42.95**

ES is pleased to offer the new models featured below, manufactured in mainland China. Our president and staff visited each factory to select these models and our own inspectors carefully check each microscope before shipment to the U.S.A.. Optically, these microscopes are excellent and a true bargain. Mechanically and overall finish-wise, they are second to Japanese models, but certainly very acceptable for classroom lab applications. We believe you will be very pleased with both their performance and price.

STUDENT 400X BIOLOGICAL MICROSCOPE

• International Standard Objectives & Eyepieces **• Precision Achromats**
• Heavy Duty Construction

Ruggedly built for heavy duty classroom usage, this 400X microscope features full-sized international standard eyepiece and objectives. Optically, it is an excellent system with good resolution, centering and parfocal features. At this price it represents an outstanding value and it will provide many years of service. Set-screw lock-on eyepiece and adjustable rack-stop minimize damage.

SPECIFICATIONS:
Magnification: 40X, 100X, 400X **Viewing Angle:** 45°
Objectives: 4X, 10X, 40X Spring loaded, parfocal centered achromats, 21 mm standard.
Eyepiece: 10X wide field, 23 mm standard **Focusing:** Rack & pinion with built-in clutch, rack stop.

Objective (X)	N..A.	F.L. (mm)	Working Dist. (mm)	Field of View
4X	0.10	30.38	16.00	4.0 mm
10X	0.25	17.13	7.31	1.65 mm
40X	0.65	4.56	0.45	0.40 mm

System Length: 205 mm **Tube Length:** 160 mm **Weight:** 5 lbs. **Height:** 13"
Illumination: Built-in 20 watt, 100 V, substage rotary diaphragm with 5 apertures: 20 mm, 8 mm, 6 mm, 5 mm, 4 mm.
Stage Size: 120 mm x 110 mm with locked-in stage spring clips

A. Student 400X Illuminated Microscope	**E38,691**	**$240.00**
B. Student 400X Microscope With Substage Mirror 40 mm diameter plano/concave mirror on gimbal mount, substage rotary diaphragm with 5 apertures: **20 mm, 8 mm, 6 mm, 5 mm, 4 mm.**	**E38,469**	**$210.00**
Mechanical Stage	**E39,045**	**$59.95**

LABORATORY 400X BIOLOGICAL MICROSCOPE

• Dual Coarse & Fine Focus **• International Standard DIN Objectives & Eyepieces**
• Built-in Illuminator **• 360° Rotatable Head**

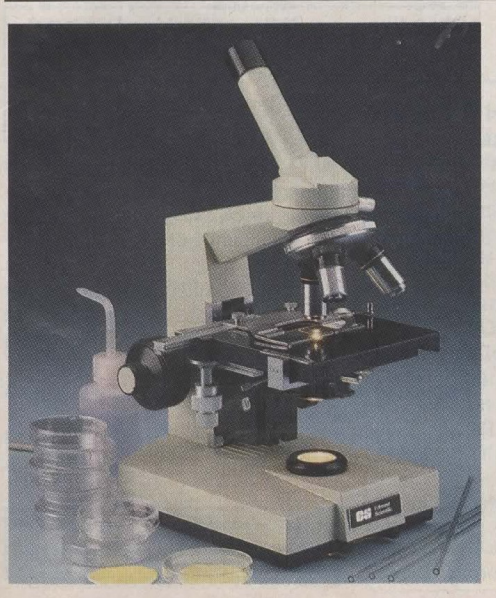
A truly professional laboratory instrument with all of the fine features found on Japanese scopes costing twice as much. Featuring international standard DIN objectives and eyepieces and coated fully-achromatic optics, the resolution, centering and parfocal features all perform excellently. Mechanical movements are smooth and positive plus full security locks on eyepiece, stage clips and rack stop. Baked-on chemical resistant enamel finish and color coded objectives.

SPECIFICATIONS:
Magnification: 40X, 100X, 400X
Objectives: 4X, 10X, 40X Springloaded, parfocal, centered achromatic, 21 mm Int'l. Std.
Eyepiece: 10X wide field with pointer, 23 mm Int'l. Std.

Objective (X)	N.A.	F.L.(mm)	Working Dist. (mm)	Field of View
4X	0.10	30.38	16.00	4.0 mm
10X	0.25	17.13	7.31	1.65 mm
40X	0.65	4.56	0.45	0.40 mm

System Length: 205 mm (DIN 45 mm + 160 mm Tube) **Tube Length:** 160 mm
Illumination: Built-in 15 watt, 110 V with condensor (N.A. 0.65), substage rotary diaphragm with 5 apertures: 20 mm, 8 mm, 6 mm, 5 mm, 4 mm.
Stage Size: 120 mm x 110 mm with locked-in stage spring clips. **Weight:** 8 lbs. **Height:** 14" **Viewing Angle:** 45°
Focusing: Rack & pinion with individual coarse & fine controls and built-in sliding clutch, rack stop.

Laboratory 400X Biological Microscope	**E38,470**	**$299.00**
Mechanical Stage	**E39,045**	**$59.95**
1,000X Option/100X Oil Immersion Objective: Our 100X spring-loaded oil immersion objective screws into the rotating turret of our #38,470 microscope to give you 1,000X magnification.	**E38,692**	**$75.00**
1/2 Oz. Tube of Low Viscosity Immersion Oil	**E38,502**	**$4.50**



LABORATORY 1000X MICROSCOPE WITH STAGE

• International Standard Objectives & Eyepieces **• Precision Graduated X-Y Stage**
• Intensity-Adjustable Illuminator **• 360° Rotatable Head**
• Coaxial Coarse/Fine Focus

A precision laboratory instrument for advanced biological studies or research at approximately one half the price of similar Japanese models. Features international standard objectives and eyepieces with fully coated achromatic optics; centering and parfocal features all perform excellently. Stage movement (focus) is a coaxial coarse/fine knob on both sides of the body for smooth, easy operation. The built-in X-Y mechanical stage also features a coaxial control for systematic, precise movement of the glass slide. Comes complete with wooden case, dust cover and 5 ft. cord, 3 prong grounded plug. Viewing angle is 45°.

SPECIFICATIONS:
Eyepieces: 10X WF, 23 mm int'l. std. **Magnification:** 100X, 400X, 1000X

Objective	N..A.	F.L. (mm)	Working Dist. (mm)	Field of View(mm)
10X	0.25	17.13	6.80	1.80
40X	0.65	4.5	0.45	0.45
100X	1.25	1.86	0.13	0.16

System Length: 205 mm (DIN 45 mm + 160 mm tube) **Viewing Angle:** 45°
Tube Length: 160 mm **Weight:** 13 lbs. **Height:** 14" overall
Objectives: 10X; 40X and 100X spring loaded; parfocal, centeredachromatic, 21 mm international std. **Focusing:** Coaxial coarse/fine
Illumination: Substage built-in 15 watt, 110 V with condensor (N.A. 1.20), iris diaphragm, 63.5 mm dia. filter mount
Stage Size: 110 mm x 125 mm with X-Y graduated mechanical stage

1000X Laboratory Microscope With Stage	**E38,693**	**$575.00**

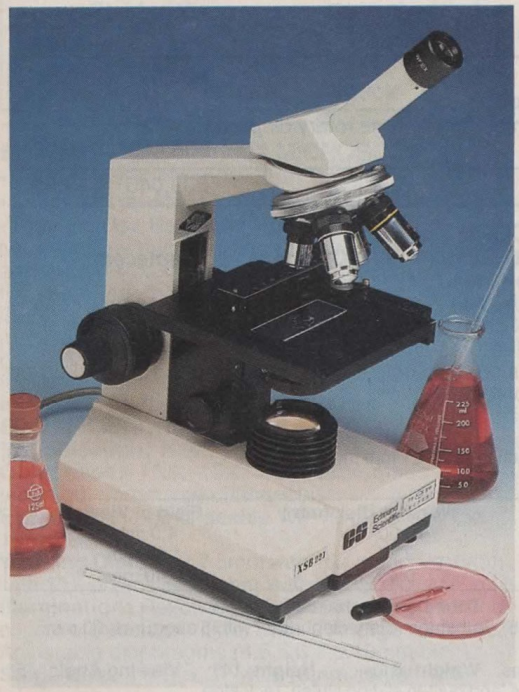
NEW! EDMUND DELUXE LABORATORY SERIES II
- **EXCEPTIONAL VALUE**
- **FINEST DIN-TYPE OPTICAL COMPONENTS**
- **U.S. FACTORY SERVICE AVAILABLE**
- **FACTORY DIRECT PRICES**

To complement our Medical Laboratory Series and our Industrial Stereos, we are proud to introduce our Deluxe Laboratory Series II. These models feature extra heavy-duty construction necessary for vibration-free critical viewing. Optical systems feature the finest DIN-type components. They represent outstanding quality at a reasonable price because we sell them only on a direct basis (no dealers or salesmen). We guarantee factory service from our Barrington, NJ plant, should it be required. Replacement eyepieces and objectives are available for all models. All objectives are parfocaled so that you can change power without refocusing and all are fully achromatic. **Two year limited warranty.**

ES PLAN MICROSCOPES

- **Superior Flat Field Performance**
- **Finest DIN-Type Optical Components**
- **Economical Price/Made in China**
- **U.S. Factory Service Available**

ES is pleased to offer this new professional Plan Laboratory Microscope manufactured in mainland China. Mr. Yoshio Tsutsumi of our Tokyo staff personally selected this model for its outstanding quality, performance and price. This particular factory is noted for its professional instruments which it has been manufacturing for over 30 years. It is the largest optical factory in China. Optically and mechanically, this microscope is excellent and a true bargain. Overall finish details are second to Japanese models, but still very acceptable. We believe you will be very pleased with the performance and the trernendous savings. Plan microscopes are the optimum in optical performance with 90-100% of the field of view in perfect focus. This is the true meaning of wide flat field. All optical components are International DIN standard-type and are parfocal so that you can change power without refocusing. Mechanical construction is extra heavy-duty for vibration-free viewing at critical high magnification. All movements are smooth and fully calibrated. Viewing angle is a comfortable 45° for extended observations. The stereo eyepiece assembly is 360° rotatable and adjustable for interpupillary distance. Includes storage case, dust cover and replacement bulbs.



1600X PLAN MONOCULAR MICROSCOPE

- **Single Tube Monocular Viewing**
- **Four Objective Ball Bearing Nosepiece**

SPECIFICATIONS:
Magnification: 25X - 1600X

	Objectives			
Eyepiece	**4X**	**10X**	**40X**	**100X**
H6.3X	25.2	63	252	630
P10X	40	100	400	1000
P16X	64	160	640	1600
Eyepiece:	DIN-Type (Int'l. Std. 23mm) H6.3X-P10X-P16X			

Field of View: (mm)

	Objectives			
Eyepiece	**4X**	**10X**	**40X**	**100X**
H6.3X	5.2	2.0	.48	.19
P10X	4.5	1.75	.43	.15
P16X	3.4	1.3	.33	.12

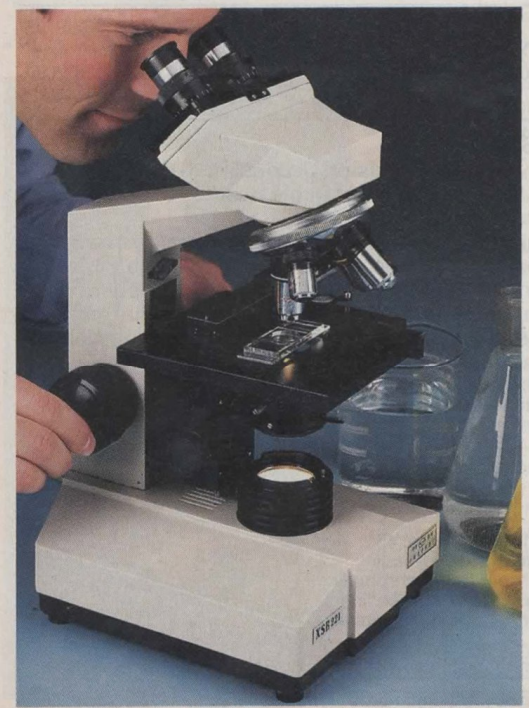
Objectives:
DIN-Type Plan Parfocal 4X-10X-40X-100X
Spring Loaded/Oil Immersion
System Length: 205mm (DIN 45mm + Tube 160mm)

Tube Length: 160mm
Viewing Angle: 45°

Objective	N.A.	Working Dis.(mm)
4X	0.1	16.93
10X	0.25	3.45
40X	0.65	0.63
100X	1.25	0.18

Illumination: Built-in 6V, 15W halogen bulb with intensity regulator. Abbe-type N.A. 1.25 condenser with variable iris diaphragm yellow, green and blue filters. Rack and pinion focusing for condenser.
Stage Size: 125mm x 155mm with 28mm center hole. Built-in coaxial calibrated X/Y stage. 50mm front to back 70mm left to right with low position coaxial controls.
Focusing: Coaxial coarse and fine, calibrated in 0.002mm graduations.

Monocular Plan Microscope **E39,122** **$1,050.00**



1600X PLAN BINOCULAR MICROSCOPE

- **Professional 45° Binocular Viewing**
- **Four Objective Ball Bearing Nosepiece**

SPECIFICATIONS:
Magnification: 25X - 1600X

	Objectives			
Eyepiece	**4X**	**10X**	**40X**	**100X**
H6.3X	25.2	63	252	630
P10X	40	100	400	1000
P16X	64	160	640	1600

Eyepiece: DIN-Type (Int'l. Std. 23mm) H6.3X-P10X-P16X

Field of View: (mm)

	Objectives			
Eyepiece	**4X**	**10X**	**40X**	**100X**
H6.3X	5.2	2.0	.48	.19
P10X	4.5	1.75	.43	.15
P16X	3.4	1.3	.33	.12

Objectives:
DIN-Type Parfocal 4X-10X-40X-100X
Spring Loaded/Oil Immersion
System Length: 205mm (DIN 45mm + Tube 160mm)
Tube Length: 160mm

Viewing Angle: 45°

Objective	N.A.	Working Dis.(mm)
4X	0.11	6.93
10X	0.25	3.45
40X	0.65	0.63
100X	1.25	0.18

Illumination: Built-in 6V, 15W halogen bulb with intensity regulator. Abbe-type N.A. 1.25 condenser with variable iris diaphragm yellow, green and blue filters. Rack and pinion focusing for condenser.
Stage Size: 125mm x 155mm with 28mm center hole. Built-in coaxial calibrated X/Y stage. 50mm front to back, 70mm left to right with low position coaxial controls.
Focusing: Coaxial coarse and fine, calibrated in 0.002mm graduations.
Binocular: Individually adjustable calibrated eyepiece tubes, 55 - 75mm interpupillary adjustable.

Binocular Plan Microscope **E38,891** **$1,350.00**

EDMUND SCIENTIFIC BASIC STEREO MICROSCOPE

• 3-D Resolution • 20X Magnification
• All Metal Construction • Portable Illuminator

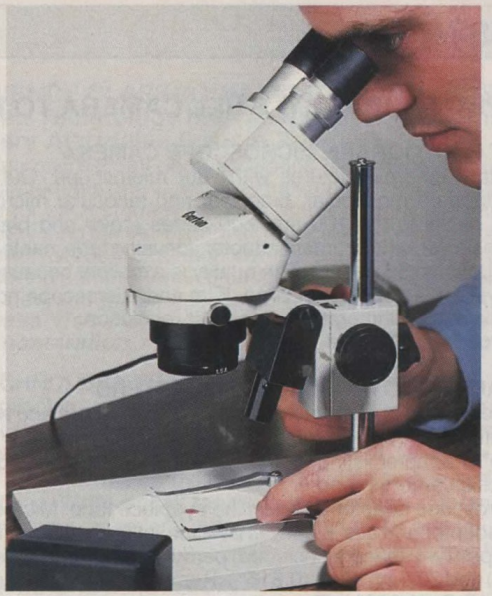
Our basic stereo microscope provides the same high resolution 3-D image found in more expensive models. Rugged steel body and base construction plus precision coated optical glass lenses make this instrument well suited for both demanding classroom and industrial applications. It features an extra-long 2-3/4" working distance (objective tip to subject) and a height-adjustable support pole making it ideal for dissecting specimens and for parts assembly while observing. The interpupillary distance is adjustable and the right eyepiece has an individual diopter adjustment. Many other quality features: non-slip base, stainless spring clips, portable penlight illuminator and baked enamel finish.

Magnification: 20X
Objectives: 2X matched achromatic objectives
Eyepiece: WF10X with set screwlock (21 mm O.D.)
Working Distance: 71.6 mm
Field of View: 8.5 mm
Illumination: Removable penlight (2 "AA"s)
Stage Size: 60 mm glass with spring clips.
Focusing: Rack and pinion
Weight: 2.2 pounds **Height:** 7" to 11"
Gray body and base. Black and silver trim.

Stereo Microscope	E31,140	$299.00

Replacement Eyepieces for above models
#31,140 & #34,746 Only. (21 mm O.D.)

WF10X	**E37,388**	**$42.95**
WF15X	**E37,389**	**$49.95**
WF20X	**E37,390**	**$54.95**



HIGH POWER DEPTH PERCEPTION STEREO MICROSCOPE

• 10X To 60X Magnification
• 360° Rotatable Binocular Body
• Extra Large 9" x 6-3/8" Work Base

Reliable precision microscope is recommended for quality control personnel, opticians, geologists and electronic manufacturers. Binocular body is inclined 45°, rotatable thru 360° for comfortable observation from any direction. Lock screws hold eyepieces in place. The extra large work base makes it very stable and ideal for inspecting larger parts. Low heat built-in lamp provides brilliant illumination. All-metal construction, and precision anti-reflection coated optics.

Magnification: 10X, 15X, 20X, 30X, 40X, 45X, 60X.
Objectives: Built-in 2X. Plus supplementary 0.5X and 1.5X objectives. Effective objective becomes 2X/0.5X = 1X, 2X/1.5X = 3X.
Eyepieces: Matched wide field 10X, 15X, 20X (21 mm Dia.)
Working Distance: .05X Objective—170mm; 2X Objective —85mm; 3X Objective—50mm.
Field of View:

Objective:	3X	2X	1X
10X Eyepiece	5.6mm	8.5mm	17.0mm
15X Eyepiece	4.3mm	6.5mm	13.0mm
20X Eyepiece	2.6mm	4.0mm	8.0mm

Illumination: 3 watt bulb and condenser lens with 120 volt transformer, all included.
Stage: 100mm diameter with clips.
Focusing: Rack and pinion.
Weight: 10 pounds **Height:** 9" to 14"
Focus Travel Pole: 14 mm dia.

Microscope	E34,746	$675.00

Fluorescent Ring Illuminator: Optional 110V cool light. **E38,336 $235.00**

DUAL ILLUMINATION 20X - 30X STEREO MICROSCOPE

• Transmission/Incidence Illumination
• True Three-Dimensional Erect Image
• 45° Viewing Angle
• Extra-Long Working Distance

Our Industrial Stereo Microscopes are available in either 20X or 30X magnification, each with superb depth perception and wide, flat field of view. The Dual Illumination System allows objects to be lighted from above, below or both together. The extra long working distance and adjustable focus pole allow you to put large objects on the stage. The 45° viewing angle makes viewing comfortable over extended periods. Features all metal construction, fully-coated achromatic optics, wooden storage case and dust cover, grounded plug.

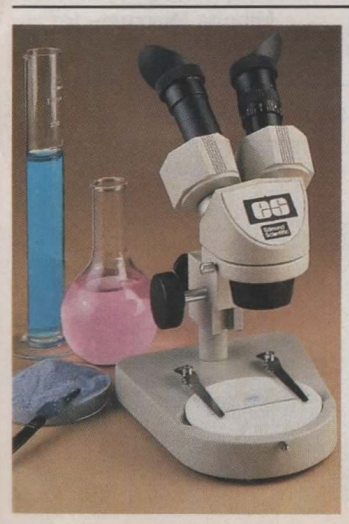
SPECIFICATIONS:

Model Number	E38,694	E38,695
Price	$550.00	$575.00

Magnification:	20X	30X
Objectives:	2X	2X
Eyepieces:	**WF10X (23mm)**	**WF15X(23mm)**
Working Distance:	90mm	90mm
Field of View:	9.5mm	6.5mm
Stage Size:	90mm Diameter with 30mm substage daylight filter	
Focusing:	Rack and Pinion	
Illumination:	Transmitted, incident; or both simultaneously	
Power:	110V/18W Transformer 12V - 10W Incident 12V - 3W Transmitted	
Binocular:	44 to 70mm interpupillary adjustable	
Focus Pole Travel:	5.7 Inches/18mm Dia.	
Height:	12.5 Inches	
Weight:	12lbs.	

ACCESSORIES FOR E37,695

A) Fluorescent Ring Illuminator.
110V E38,336 $235.00
B) Replacement Bulb E38,337 $78.00
C) Substage Adapter Kit: Metal stand and frosted 100 mm stage, requires above illuminator.
E38,338 $99.00
D) X/Y Mechanical Stage: Fits 100 mm aperture on base, 30 mm front to back, 70 mm right to left travel, reads in 0.1 mm increments, 60 mm x 124 mm stage area. **E37,385 $199.00**



EDMUND HIGH POWER STEREO MICROSCOPE

• 60X/30X Magnification • Full Stereo Effect At 60X
• 360° Rotatable Head • True Erect Image

Our new design provides the viewer the full stereoscopic effect even at 60X magnification. Ideal for critical depth perception inspection of minute components. Features 45° viewing head rotatable through 360°, diopter adjustable right eyepiece, reversible white/black stage for high contrast backgrounds and fully coated precision optics. We suggest adequate illumination for high power viewing.

SPECIFICATIONS:

Magnification: 30X/60X
Objectives: Built-in 2XSupplementary 2X Multiplier
Eyepieces: Pair WF15X with rubber eyeguards (25mm O.D.)
Weight: 4.2 pounds **Height:** 9" to 12-1/2"
Working Distance: 30X—75 mm 60X—26 mm **Field of View:** 30X—7.0 mm 60X—3.5 mm
Tube Length: 175 mm
Binocular: 53 to 73 mm interpupillary adjustable.

Microscope and Case	E37,695	$650.00

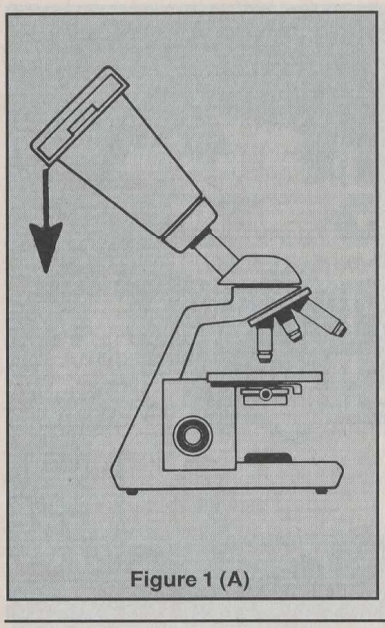


Figure 1 (A)

DIRECT PHOTOGRAPHY: STILL CAMERA TO MICROSCOPE

A) INSTANT PHOTOGRAPH MICROSCOPE CAMERA
Produce instant Polaroid pictures with your microscope. Our special camera fits virtually all standard monocular, binocular and trinocular microscopes. Accepts all Polaroid film packs in the 100 and 600 series (color and black & white). Comes complete with universal instrument adapter, focusing tube, cable release and comprehensive instructions (56 pages). The quality is excellent because the camera utilizes the optical system of your microscope. Film and microscope not included.
Yields 3-1/4" x 4-1/4" photograph. Excellent resolution.
Instant Microscope Camera **E31,825 $275.00**

B) 35MM CAMERA TO MICROSCOPE ADAPTERS
Diagram indicates the arrangement of your 35mm camera and two required adapters for taking pictures through your microscope.
Item A): See"T" adapter listing for the stock number and price of the correct adapter for your specific camera brand.
Item B): Microscope adapter locks on the eyepiece tube. Microscope's eyepiece fits through the adapter and sits in normal position, utilizing the original optical system of the microscope. Two spacers (included) permit mounting on eyepiece tubes of 23mm O.D. (0.915") and 20.5mm O.D. (0.815"). Remove the spacers and it will accept a tube size of 27mm O.D. (1.066"). The split spacers permit accommodation for odd sized eyepiece tubes. Some shimming may be necessary. Black anodized all metal construction. Instructions included.
Microscope Adapter **E41,100 $39.95**

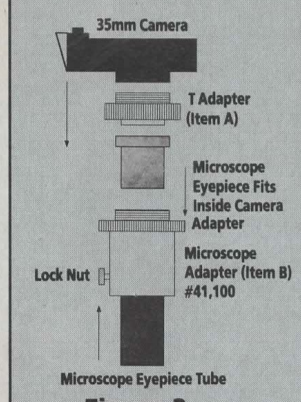


Figure 2

Figure 2 (B)

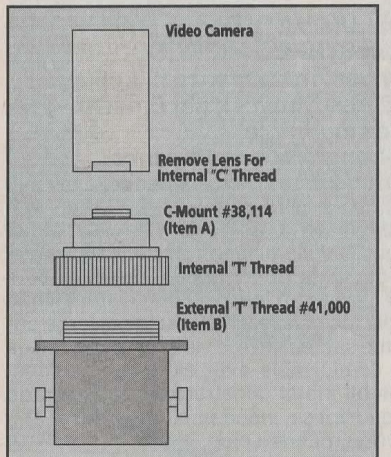


Figure 1 (C)

DIRECT VIDEO: VIDEO CAMERA TO MICROSCOPE

C) BASIC C-MOUNT SYSTEM
As the diagram shows, to complete this system you will need a " C" mount (A) and a microscope adapter (B). Your video camera must have a removable lens for this system to work.

(Item A): "C" Mount for Video-To-Microscope Hook-Up. Black anodized adapter has a"C" thread at male end to fit into standard video camera lens receptacle. Female end accepts "T" thread. Use this adapter in conjunction with any microscope-to-camera adapter that ends in a"T"-" thread.
"C" Mount Adapter **E38,114 $29.95**
(Item B): Microscope Adapter. See description of our #41,100 above.

D) DELUXE RELAY LENS SYSTEM
Designed to provide improved imaging, high contrast and flat field, this relay lens system replaces your microscope eyepiece. Only fits microscopes which will accept 23mm O.C. International Standard Eyepieces. Relay lens system is equivalent to a 10X eyepiece. Works on any microscope with a tube length of 160mm to 170mm. Extra support of the video camera, such as a tripod, may be required depending on camera size.
Deluxe Relay Lens System **E37,820 $199.00**

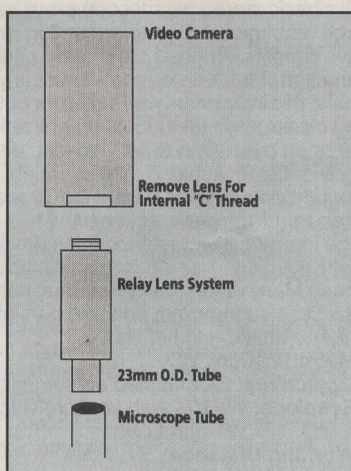
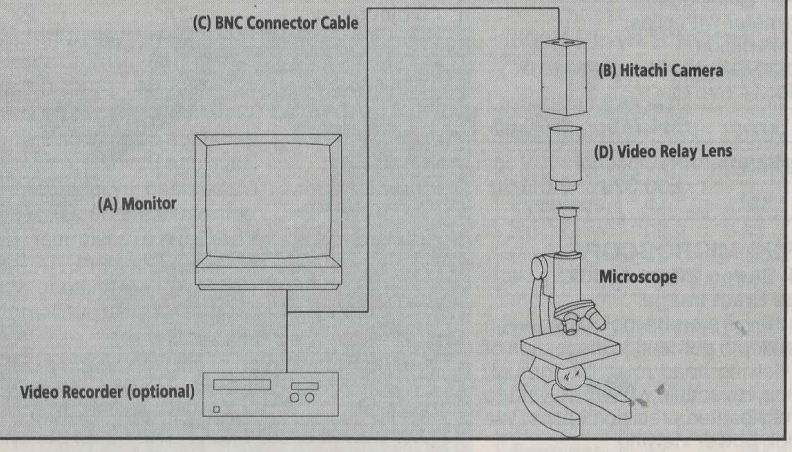


Figure 2 (D)

Typical Video-Microscopy Set-Up



OUR MOST POPULAR VIDEO-MICROSCOPY SYSTEM COMPONENTS

A) HITACHI CT1365VM 13 INCH COLOR MONITOR
Ideal monitor for use with above system
E37,822 $339.00

B) Sony SSC-C350 Color Video Camera and Power Supply.
E37,821 $995.00

C)"BNC" TYPE CONNECTOR CABLE
Hitachi cameras utilize "BNC" type connectors (Bayonet Type with Pin and Sheath). 13" monitor accepts audio/video jacks. 6' Cable with one "BNC" terminal and one audio/video jack terminal **E37,823 $24.00**

D) Edmund Deluxe Relay Lens System
E37,820 $199.00

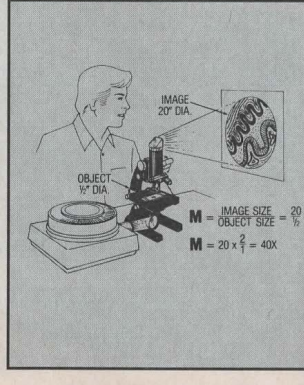
CAMERA TO "T" ADAPTER

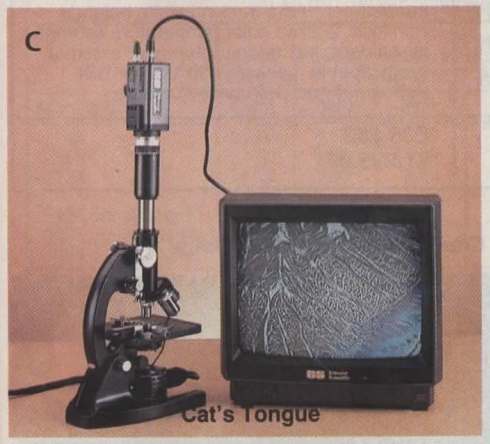
"T" Adapters. Specify stock number for correct camera type listed below. Not for auto focus, except #37,819.
Fitting type: **B= Bayonet; S = Screw.** **Each $18.95**

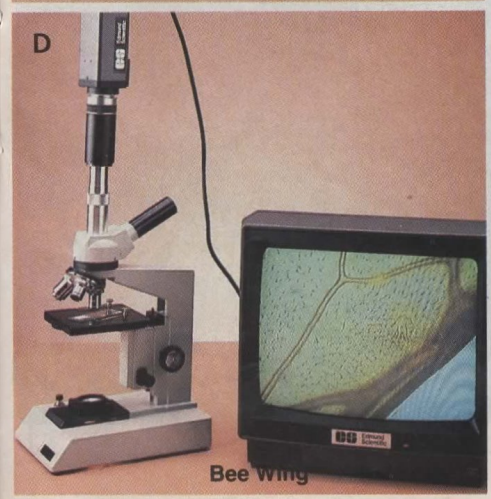
Universal Thread Mount (S) **E42,832**
Pentax, All K&M, Ricoh, Vivitar, Chinon (B) **E42,833**
All SLR Minolta models (B) **E42,834**
Leica (S) **E42,838**
Nikon (B) **E42,835**
Konica (B) **E31,517**
Canon (B) **E42,836**
Olympus (B) **E42,837**
Yashica (B) **E31,516**
Minolta Maxxum - for autofocus (B) **E37,819**

TURN YOUR MICROSCOPE INTO A PROJECTOR

Place this aluminized first grade right angle prism directly on top of your microscope's eyepiece to project the viewed image onto a small screen or flat white cardboard. Share observations with an entire class. Microscope should have a substage illuminator or independent high intensity microscope lamp. Projection distance is limited to three feet, maximum.
Prism (54 x 38 x 38 mm)
E32,194 $16.80
"Microcell" Projection Screen (1 Ft. x 1 Ft.) **E70,934 $14.50**







SCIENCE CLASSROOM VIDEO MICROSCOPY SYSTEM

• New Technology For The Nineties • Maximizes Student Observation And Participation
• Very Affordable System Price

Video microscopy demonstrations have become both a popular and a very successful way to involve your students and to achieve maximum visual impact. Since only one microscope is required rather than one for each student, a better grade microscope can be afforded. Also the teacher can be assured by supervising the set-up that all participants will be viewing the same image at optimal focus. With a simple pointer, student attention can be directed to all of the different interest points on the monitor image, assuring comprehensive observation. Also, by involving students in the system set-up, they can learn the new and growing technology of video applications.

Please visit our booth at the National Science Teachers Association Conventions for a live demonstration.

TECHNOLOGY THAT WORKS AND TEACHES

Combining video displays with microscopes is an exciting new technology with endless applications in industry and education. Video microscopy demonstrations save time and assure that all participants are viewing the same image at maximum focus. New high resolution (340 TV Line) monitors such as the Hitachi CT1365VM. They provide crisp, detailed images and we have higher resolution monitors in our Industrial Catalog. **Write or call for more information.** Our modular, easy-hook-up system allows you to use your equipment on several different microscopes and to update components as technology progresses. Start exploring today...you will find our prices reasonable because we sell direct to you.

A) MEDICAL/BIOLOGICAL

Featuring our Laboratory Series Trinocular Head Medical Microscope, this system allows you to switch quickly from eye viewing to the video display. Because of the many illumination controls (adjustable condensor, iris diaphragm, illuminator reostat) perfect imaging can be realized at all powers, even 1000X. The parfocal quadruple ball-bearing objective nosepiece allows you to change power smoothly without refocusing. This is our most popular system when we exhibit at the science teacher conventions.

Medical System (40X to 1000X) Trinocular Medical Microscope		
	E37,324	$2,160.00
Sony Video Camera	E37,821	$995.00
Video Relay Lens	E37,820	$199.00
Hitachi Color Monitor	E37,822	$339.00
BNC Connector Cables	E37,823	$24.00
Total System	E38,800	$3,717.00

B) INDUSTRIAL/DISSECTING SYSTEM

Featuring our Zoom Inspection Microscope, this system offers 7.5X to 30X magnification. Unique zoom feature lets you inspect large field at low power and then zoom in for detail inspection at high power. Is ideal for quality control work and miniature component assembly because of the long working distance. Fluorescent ring illuminator provides cool light which will not harm heat-sensitive components. Biology teachers prefer this system for dissecting demos because the microscope head swings on the base over a dissecting pan.

Industrial Inspection (7.5X to 30X Zoom) Zoom Inspection Microscope		
	E38,334	$690.00
Fluorsecent Ring Illuminator		
	E38,336	$235.00
Sony Video Camera	E37,821	$995.00
Video Relay Lens	E37,820	$199.00
Hitachi Color Monitor	E37,822	$339.00
BNC Connector Cables	E37,823	$24.00
Total System	E38,801	$2,482.00

C) LAB/BIOLOGICAL

Featuring our Four-Objective Lab Microscope, this system offers you the same powers and many of the same features as the Medical System but, at a lower price. Set-up and use are somewhat more complicated, but the image quality and resolution are excellent. The built-in X/Y Mechanical Stage allows for precision positioning and systematic review of the entire specimen. A favorite of small labs and veterinarians.

Biological System (40X to 1000X) Four Objective Lab Microscope		
	E31,315	$875.00
Plug-In Illuminator	E50,222	$57.95
Sony Video Camera	E37,821	$995.00
Video Relay Lens	E37,820	$199.00
Hitachi Color Monitor	E37,822	$339.00
BNC Connector Cables	E37,823	$24.00
Total System	E38,802	$2,489.95

D) CLASSROOM VIDEO MICROSCOPY SYSTEM

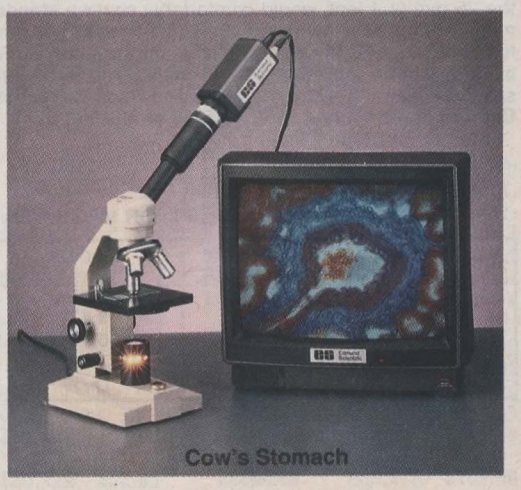
Featuring a special dual-tube version of our graduate student microscope, this system provides dramatic results at a very economical price of only **$2,177.00**. It is extremely easy to set up and the dual tube microscope head allows you to quickly switch from direct eye viewing to the high resolution video display. Since the video relay lens replaces and acts as a 10X eyepiece, the video system images at 400X - 100X - 40X. Using the 15X eyepiece in direct eye observation, the full 600X magnification is possible.

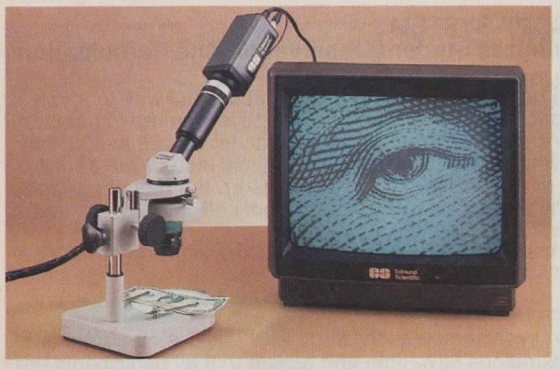
400X - 100X - 40X Classroom System Dual-Tube Graduate Microscope		
	E37,657	$620.00
Sony Video Camera	E37,821	$995.00
Video Relay Lens	E37,820	$199.00
Hitachi Color Monitor	E37,822	$339.00
BNC Connector Cables	E37,823	$24.00
Total System	E38,803	$2,177.00

(E) BASIC CLASSROOM VIDEO SYSTEM

Featuring our very popular 400X Lab Microscope, this system is an economical way to introduce video microscopy into your educational program. Set up is quick and easy and image quality is very good. The Video Relay Lens replaces and acts as a 10X eyepiece fitting directly into the viewing tube.

400X-100X-40X Biological Microscope		
	E38,470	$299.00
Sony Video Camera	E37,821	$995.00
Video Relay Lens	E37,820	$199.00
Hitachi Color Monitor	E37,822	$339.00
BNC Connector Cables	E37,823	$24.00
Total System	E38,804	$1,856.00





STANDARD RESOLUTION VIDEO MONITORS

SPECIFICATIONS	HITACHI 13"	SONY 20"
Video Signal Input	NTSC Color	NTSC Color
Sync	Negative	Negative
Picture Tube	Tinted 13" Diagonal	Trinitron Microblack 20"Diagonal
Controls	Tint, color, volume V-hold, black level power	Hue, color, picture brightness, sharpness power
Power Input	AC 120V ± 10%	110 - 132V AC, 50/60HZ
Video Input	Std. phono Jack	BNC type connector / 75 ohms switchable
Audio Input	Std. phono jack	Std. phono jack
Horizontal Resolution	340 lines	400 lines
Dimensions	13-3/4"W x 13"H x 14-3/4"D	20-1/2"W x 19-1/2"H x 19"D
Weight	20.9 lbs.	50.8 lbs.
Stock Number	**E37,822**	**E39,243**
Price	**$339.00**	**$495.00**

HARDWARE FOR MONITORS

A) "BNC" TYPE CONNECTOR CABLE (BNC TO RCA)

Sony and Hitachi cameras utilize "BNC" type connectors (Bayonet Type with Pin and Sheath). 13" monitors accept audio/video jacks. 6' cable with one "BNC" terminal and one audio/video jack terminal.
E37,823 $24.00

B) DOUBLE "BNC" TYPE CABLE (BNC TO BNC)

6' cable with "BNC" terminal at each end for use with 20" monitor **E38,903 $18.00**

SONY TECHNICAL VIDEO CAMERAS

Our Sony video cameras are all STD "C" mount lens compatible (these products do not come with a lens). Common features include: 1/2" CCD imager, 46dB min video S/N ratio, switchable on/off AGC, hyper HAD interline transfer CCD image pick-up device, auto white balance/auto track white balance switchable, operational temperature 14°~122°F.
With each camera, ES includes a 12V DC transformer/power supply (110V AC Input) already wired to the power input plug so that it is ready to operate. Video output for each camera requires a BNC-type connector (not included). Please select the proper cable connector to match your monitor.

SPECIFICATIONS:	Monochrome (B/W) Video Camera SSC-M350	Color Video Camera SSC-C350	High Resolution Color Video Camera SSC-S20
Signal Format	NTSC	NTSC	NTSC/YC STD
Minimum Illumination	0.3 lux	2.5 lux	4.0 lux
Horizontal Resolution	330 lines	330 lines	480 lines
Picture Elements	510H x 492V	510H x 492V	768H x 494V
Sensing Area	6.2mmH x 4.6mmV	6.2mmH x 4.6mmV	8.3mmH x 4.7mmV
Video Output	1.0Vp-p, 75 ohms, sync neg	1.0Vp-p, 75 ohms, sync neg	BNC x 1
Electronic Shutter	1/60,1/100,1/250,1/500,1/1000, 1/2000, 1/4000, 1/10,000	1/60,1/100,1/250,1/500,1/1000 1/2000, 1/4000, 1/10,000	1/100, 1/10,000
Dimensions	2-1/2"W x 2-1/4"H x 6-1/8"D	2-1/2"W x 2-1/4"H x 6-1/8"D	2-1/2"W x 3-1/4"H x 6"D
Weight	1 lb. 7 oz.	1 lb. 7 oz.	1 lb. 7 oz.
Special Features	Built-in electronic CCD iris function allows use of inexpensive manual iris lenses.	Built-in electronic CCD iris allows use of inexpensive manual iris lenses. Lockable Automatic White Balance (AWB) mode retains setting in memory even when power is turned off. Automatic Tracking White feature continuously adjusts camera for optimum color reproduction.	Built-in: camera ID (0-99) , time/date generator . 4 day battery backup. Isolated power transformer. Auto tracking white balance with lock. 2 fixed color temperature settings for outdoor and indoor. Internal or external sync capable (genlock with VBS or BS). Subcarrier and H-phase adjustable.
Stock Number	**E38,898**	**E37,821**	**E39,252**
Price	**$595.00**	**$995.00**	**$1,295.00**

VIDEO MAGNIFIER SYSTEMS

• Ideal Inspection Work Stations • Excellent Low Vision Aids • Dramatic Classroom Dissecting Visual
• Variety of Magnifications and Field Coverage Available

Video Magnifier Systems can do the work of many different handheld magnifiers with the big advantage of more comfortable viewing and wider fields of view. Higher power systems for industrial inspection applications can be customized to maximize job productivity. Reader systems, as a low vision aid for the vision-impaired, can make any newspaper or book a "Large Print" edition on screen. Teachers can present a dramatic live dissecting demonstration that the entire class can view on the monitor without crowding around the work area. At the heart of our system is a compact Watec b/w video camera with low light lux sensitivity so that the system works well in normal room light. Our extension arm and base allow for quick positioning of the camera and complete versatility in set-ups. Pick the appropriate lens for your application to complete the camera system. For example, the 25 mm f1.4 lens would comfortably cover a standard 2" newspaper column within its field of view at 5X magnification as a low vision aid for the visually impaired. The 50mm f1.8 lens at 7X magnification is excellent for inspecting PC boards and miniature assemblies. Finally, we recommend the Hitachi 13" monitor but any monitor may be used and larger monitors will increase the magnification values. Actual cost will vary with lens selected. Our other cameras (b/w and color) can be used in this system.

Call Joe Makemson at 609-573-6259 or 609-573-6253 (9:00AM to 5:00PM EST Monday thru Friday).

TYPICAL SYSTEM COST:

E39,244	Video Camera	$450.00	
E39,088	Extension Arm & Base	110.00	
	Appropriate Lens (Estimate)	100.00	
E37,822	Hitachi 13" Monitor	339.00	
	Total Cost (Approximate)	$999.00	

CLOSE FOCUS VIDEO LENSES FOR MAGNIFIER SYSTEMS

APPROPRIATE LENS	OBJECT DISTANCE	FIELD OF VIEW	MAGNIFICATION ON 13" MONITOR	STOCK NUMBER	PRICE
50mm f1.8	16"	1.75"	6X	E39,083	$140.00
25mm f1.4	16"	3.37"	3X	E39,084	115.00
16mm f1.4	16"	6.00"	1.4X	E39,085	69.50
12.5mm f1.3	16"	7.00"	1.5X	E39,086	139.50
8mm f1.3	16"	11.50"	1X	E39,087	105.50

INTERNATIONAL STANDARD MICROSCOPE EYEPIECES AND OBJECTIVES

ES offers a full selection of objectives and eyepieces for use with ES models and other brands.

OBJECTIVES: ES offers Japanese Std. 36mm type and DIN (Deutche Industrie Norm) 45mm type. The numerical designation refers to the distance from turret face to material on stage at focus. For both thread is 0.7965" (20.1mm) dia., 36 TPI, 55° Whitworth. Both are available in color-corrected achromatic design. In DIN-type we also offer Micro-plan (Semi-plan) and Plan-type objectives which provide flatter fields for critical inspections. A typical DIN type microscope utilizes 45mm objectives + 160mm tube length for a 205mm system. Some Japanese student models such as our #36,135 utilize 36 mm objectives + 170mm tube length for a 206mm system. Since thread size is identical they could be interchanged but power will differ (appox. 10% differential).

DIN OBJECTIVES (45mm)

	Focal Length	Field of View	Working Distance	N.A. Numerical Aperture	Stock Number	Price
Achromatic	(mm)	(mm)	(mm)			
4X	30.60	4.50	15.80	0.10	E36,131	$ 42.95
10X	16.60	1.80	6.30	0.25	E36,132	$ 52.95
*20X Spring Loaded	8.78	0.90	1.50	0.40	E38,339	$ 64.95
*40X Spring Loaded	4.50	0.45	0.45	0.65	E36,133	$ 79.95
*60X Spring Loaded	3.05	0.30	0.28	0.85	E38,340	$110.00
*100X Spring Loaded	1.86	0.18	0.13	1.25	E36,134	$155.00
Micro-plan (Semi-plan)						
4X	30.60	4.50	15.80	0.10	E38,341	$ 72.00
10X	16.60	1.80	6.30	0.25	E38,342	$ 93.00
*40X Spring Loaded	4.50	0.45	0.45	0.65	E38,343	$105.00
*100X Spring Loaded	1.86	0.18	0.13	1.25	E38,344	$185.00
Plan						
4X	30.60	4.50	15.80	0.10	E37,661	$ 85.00
10X	16.60	1.80	6.30	0.25	E37,662	$155.00
*40X Spring Loaded	4.50	0.45	0.45	0.65	E37,663	$275.00
*100X Spring Loaded	1.86	0.18	0.13	1.25	E37,664	$425.00

JAPAN STD. OBJECTIVES (36mm)

	Focal Length	Field of View	Working Distance	N.A. Numerical Aperture	Stock Number	Price
Achromatic	(mm)	(mm)	(mm)			
4X	30.00	4.50	15.50	0.10	E38,345	$ 32.95
5X	25.80	3.60	14.00	0.12	E30,045	$ 32.95
10X	14.80	1.80	6.80	0.25	E30,046	$ 42.95
20X	8.78	0.90	1.50	0.40	E30,047	$ 57.95
*40X Spring Loaded	4.30	0.45	0.45	0.65	E30,048	$ 62.95
*60X Spring Loaded	2.90	0.30	0.28	0.85	E30,049	$ 89.95
*100X Spring Loaded	2.70	0.18	0.13	1.25	E41,670	$129.95

*Retractable All dimensions are in mm

MICROSCOPE EYEPIECES

ES offers three design types. All are 23mm O.D. to fit International Standard Tubes.
1) Huygenian Design: Consists of two plano convex lenses positioned with both convex faces toward the object. They are designed for use with lower power achromatic objectives.
2) Wide-Field Design: Consists of two plano convex lenses with the convex surfaces facing each other. They are ideal for use with high power achromatic objectives.
3) Periplan Design: Has an additional lens element and is intended for use with Semi-Plan objectives.

MICROSCOPE EYEPIECES (23mm O.D.)

	Focal Length	Field of View	Eye Point	Stock Number	Price
Huygenian					
H5X	21.0	50.9	14.0	E30,126	$ 26.95
H10X	25.0	12.9	8.5	E30,128	$ 32.95
H15X	16.7	8.0	7.0	E30,129	$ 32.95
Wide Field					
WF10X	25.0	18.0	15.5	E36,130	$ 44.95
WF15X	16.7	13.0	12.6	E38,346	$ 74.95
WF20X	12.5	10.0	9.8	E38,347	$ 82.95
Periplan					
P10X	20.5	14.5	14.5	E37,660	$ 52.95
Zoom					
Z10-20X				E60,270	$169.00

ADVANCED STUDENT SERIES EYEPIECES AND OBJECTIVES

ES offers replacement eyepieces and objectives for our Adv. Student Series Microscopes listed on page 48. All are designed for 139mm tube length systems.

OBJECTIVES: Fully achromatic design. Thread is 0.585" (14.85mm) dia., 42 TPI.

Thread 15 mm O.D./42 TPI.

Magnification	Stock Number	Price
5X	E38,348	$21.95
10X	E38,349	$29.95
15X	E38,350	$29.95
20X	E38,351	$29.95
30X	E38,352	$29.95
*40X (Spring Loaded)	E38,353	$34.95
*50X (Spring Loaded)	E38,354	$42.95

Thread 17.50 mm O.D./42 TPI.

Magnification	Stock Number	Price
5X	E38,408	$21.95
20X	E38,409	$29.95
*50X	E38,410	$42.95

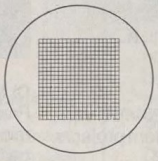
*Retractable

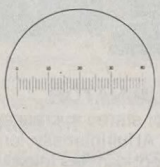
Wide-Field Eyepieces: Ramsden type, 2 element design.

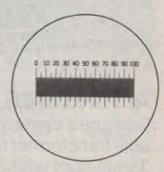
19 mm O.D. (fits #70,008 & #72,406)			21 mm O.D. (fits #34,498 & #36,101)		
Magnification	**Stock Number**	**Price**	**Magnification**	**Stock Number**	**Price**
WF10X	E38,355	$19.95	WF 10X	E38,645	$20.95
WF15X	E38,356	$20.95	WF 20X	E38,644	$22.95
WF20X	E38,357	$21.95			

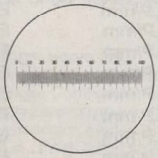
***SPRING LOADED/RETRACTABLE/OIL IMMERSION**
These terms are interchangeable and refer to the mechanism at the tip of higher power objectives which is spring loaded so that it will retract within itself when it is pressed against the slide surface. There is very little working distance with such objectives and this feature prevents slide damage. With 100X objectives we recommend optical grade clear immersion oil. Two oz. bottle.
Immersion Oil E35,736 $8.50

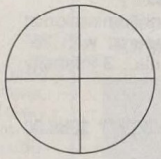
DIOPTER ADJUSTABLE EYEPIECE
Wide field 10X eyepiece fits international standard 23mm tube. Accepts 19mm diameter micrometer disc reticles within the internal field diaphragm. Eye lens is diopter adjustable to focus reticle pattern. **E36,123 $85.00**


10mm/20 Sqs.
E36,127


0.4 Inch/40 Div.
E36,128


5mm/100 Div.
E36,126

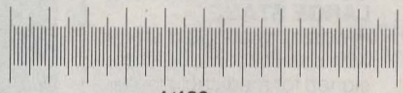

10mm/100 Div.
E36,125

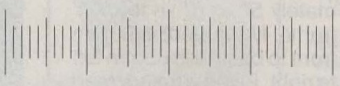

Crosshair
E36,124

19mm DIAMETER MICROMETER DISC RETICLES

5mm/100 Div.	E36,126
10mm/100 Div.	E36,125
0.4 Inch/40 Div.	E36,128
10mm/20 Div.	E36,127
Crosshair	E36,124

$24.95 Each


1/100 mm
E36,121


0.04/40 inch
E36,122

STAGE MICROMETERS
Optical-quality slide glasses with scales for calibrating magnification of objectives and for measuring objects under the microscope, independent of the system magnification.
Millimeter Scale: 1/100 E36,121 $52.95
English Scale: .04/40 inch
E36,122 $52.95

ZOOM MICROSCOPE EYEPIECE
Zooms from 10X to 20X. Fits all international standard 23mm microscope tubes. Adjustable ring clamp allows you to compensate for varying system lengths. Fully coated achromatic optics. 2¾" long overall.
Eyepiece E60,270 $169.00

A) FLUORESCENT RING ILLUMINATOR
Ideal for stereo and inspection microscopes. Provides cool white shadowless 360° illumination. Center opening is 1-7/8" dia. Ring measures 3-1/2" dia. x 1-1/4" thick overall. 8 watt fluorescent bulb, remote 110V power transformer with fuse and on/off switch, 8' cord (not grounded).

Ring Illuminator	**E38,336**	**$235.00**
8W Replacement Bulb	**E38,337**	**$78.00**

B) HI/LOW INTENSITY MICROSCOPE LAMP
Multi-purpose lamp is ideal as an economical microscope illuminator for models with sub-stage mirrors. 40 watt lamp provides ample light and has hi/low intensity control. Lamp head is mounted on a 7" long arm with 3 pivot points, 4-1/4" high base contains transformer, intensity and on/off control, 5 foot cord (2 prong). 120VAC input. Takes standard GE93 replacement bulb.

Microscope Lamp	**E38,584**	**$24.95**
Extra Bulb	**E39,442**	**$1.95**

C) EDMUND LOW HEAT MICROSCOPE I LLUMINATOR • **Safe For Extended Use**
120V illuminator with 10 watt bulb. 3-3/4" High x 2-1/4" Diameter. 1-1/4" diameter light source with daylight blue filter. 60" cord. For microscopes with substage mirror. Specially engineered design allows for heat dispersion so that unit remains touchable even after extended use.

Edmund Illuminator	**E36,719**	**$57.95**
Extra Bulb	**E36,720**	**$3.95**

D) OPTILUME ILLUMINATOR
15 watt microscope lamp operates on 120V, 6 Amps. High impact, heat resistant and vented plastic housing with 36mm dia. daylight blue filter. On and off switch conveniently mounted on right side of housing. Size: 3" H x 2" W x 2" D, cord 4-1/2 feet long with molded plug.

Optilume	**E35,240**	**$45.00**
Extra Bulb	**E39,440**	**$5.00**

E-1) RITE- LIGHT II MICROSCOPE LAMP
Can be used for both above as well as below microscope stage illumination. Ten watt bulb is mounted in heat resistant plastic housing with reflection interior. Lamp house mounted on a chromium plated steel rod stand, 5-3/4" wide, 5"H. Stand legs are rubber coated. 5' cord polarized molded plug. 115volt.

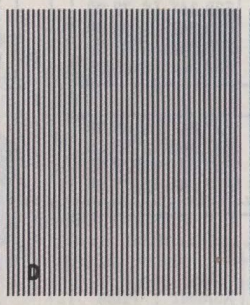
Rite-Lite II	**E35,241**	**$29.00**
Extra Bulb	**E39,439**	**$5.00**

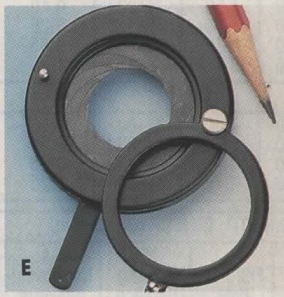
E-2) EDMUND ECONOMY ILLUMINATOR
An economical illuminator for student microscopes which can be adjusted for either below or above stage illumination. Features a 10 watt incandescent bulb mounted in a heat resistant plastic housing with reflection. Interior, steel rod stand 5-3/4" wide x 3-1/2" high, 4-1/2" long legs with no-scratch plastic coating. 120VAC input. 4 ' cord (2 prong).

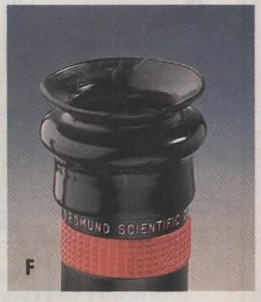
Economy Illuminator	**E39,060**	**$14.95**

F) LOW HEAT SUBSTAGE ILLUMINATOR
Designed to replace the mirror below the stage, this illuminator plugs into the mirror socket (comes with adapters to fit either 5 mm or 6 mm dia. socket hole). Heat dispersion allows unit to remain touchable and safe after extended use. 120V with 10W bulb, 1-3/8" (35 mm) dia. light source with daylight blue filter. 6' cord with molded 3-prong grounded plug.

Illuminator	**E50,222**	**$57.95**
Extra Bulb	**E38,463**	**$4.95**







A) TUNGSTEN ILLUMINATOR
Designed especially for stereo microscopy. 120V/6V variable transformer base. At full intensity, lens system projects 35mm spot with 600 foot candles intensity.

Tungsten Illuminator	**E35,237**	**$165.00**
Extra Bulb	**E39,441**	**$16.00**

FIBER OPTIC COOL LIGHT ILLUMINATORS
Systems provide 10,000 foot candles of cool illumination at 3 inches, 30 watt quartz halogen light source with 26" gooseneck fiber optic, end lens 0.88" dia., 3-intensity switch, 120VAC input.

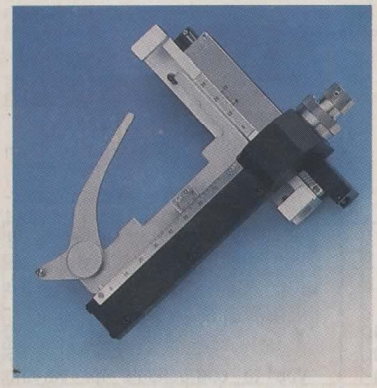
B) Heavy Duty Metal Housing Model:		
Base measures7-1/2" H x 5-1/4" diameter	**E35,277**	**$389.00**
C) High Impact Plastic Housing Model:		
Base measures 3" H x 4-1/2" W x 6-1/2" L.	**E38,583**	**$299.00**

D) MICROSCOPE RESOLUTION TARGETS
Precision ronchi rulings on standard 1" x 3" x 1.0mm thick microscope slides are ideal to evaluate focus stability, resolution, parfocal stability, field distortion and size calibration for microscopes and other optical instruments. Evaporated chrome on glass substrate, pattern is centered on slide 1.2 inches long with line frequency designated.

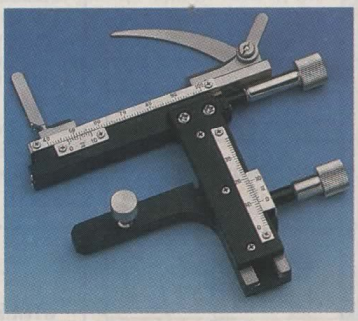
10 LP/mm	**E38,258**	**$57.75**
20 LP/mm	**E38,259**	**$62.75**
40 LP/mm	**E38,260**	**$72.75**
80 LP/mm	**E38,261**	**$82.75**
100 LP/mm	**E38,562**	**$92.75**
120 LP/mm	**E38,563**	**$102.75**
150 LP/mm	**E38,564**	**$117.75**
200 LP/mm	**E38,565**	**$142.75**
600 LP/mm	**E38,566**	**$327.75**

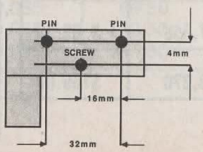
E) SUBSTAGE IRIS DIAPHRAGMS
Blued steel leaves. Brass mount 32mm filter holder.
E40,997—1-25mm aperture. 28mm threaded shoulder. **$37.00**
E40,998—1-30mm aperture. 32mm threaded shoulder. **$37.50**

F) RUBBER EYEGUARDS
Reduce annoying glare and assure proper eye-to-lens positioning. Stretch to fit many eyepieces.
Small—unstretched 24mm diameter, up to 28mm. **E34,762 $6.75**
Large—unstretched 28mm diameter, up to 32mm. **E60,100 $7.00**

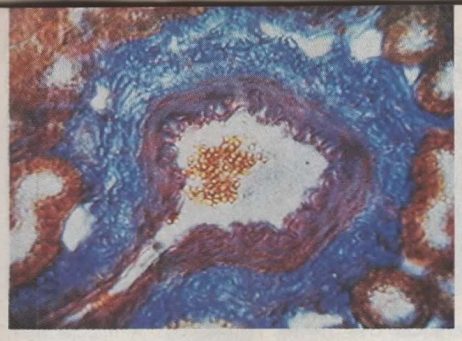


COAXIAL GRADUATED LARGE STAGE
Precision graduated stage with coaxial controls is designed for medical or large-stage laboratory microscopes. Measures approximately 5" x 6" in the X/Y frame. Movement is 35mm front to back and 65mm left to right. Fixed verniers read to 0.1mm. Coaxial control knob is horizontally positioned on the right side. Spring clip holds 1" x 3" standard glass slide. Mounting channel is 122mm long and fits stages up to 15mm thick. Lock screws recessed in approximately 15mm from each end of channel. **E30,060 $190.00**





MEDIUM SIZE MICROSCOPE STAGE
Precision graduated stage allows you to perform systematic grid coverage of specimens and to relocate fields of interest. Designed to fit mid-sized microscope stages; unit measures approximately 3" x 3" in the X/Y frame. Mounting screw is 6-40 thread and diagram below shows mounting pin layout. Movement is 30mm front to back and 50mm right to left. Fixed verniers read to 0.1mm. Dual control knobs are horizontally positioned on the right side. Slide holder with adjustable arm and spring clip accepts both large and small glass slides (maximum open 3-1/4"). Black anodized brass movement with chrome controls.
Medium Microscope Stage
E30,058 $139.00



HAND PREPARED MICROSCOPE SLIDES

• Ten Slides Per Set • 11 Subject Titles

Each specimen is hand cut by a highly skilled staff, in the "Lieder" laboratories in Germany under strictest scientific control. Their emphasis is on "detail." Complicated multi-color staining techniques are used to highlight each part of the tissue to its fullest advantage. Slides are delivered on glass with ground edges. 26 x 76mm (1" x 3"). Each specimen labeled and protected with a cover glass. **57 Different Sets. These are beautifully made slides - you will not be disappointed.**

$24.95 Each **3 Sets or More, $22.00 Each**

1.) ZOOLOGY

E38,753 : Histology of Domestic Animals, Part I
Liver of pig, t.s.; Small intestine of rabbit, t.s.; Lung of cat, t.s.; Stomach of cow, t.s.; Blood vessels of cat, t.s.; Cerebrum of pig, t.s.; tongue of cat, t.s.; Heart of pig, t.s.; Blood of chicken, st Sm.; Kidney of rabbit, t.s.

Also Available:
E39,161 : Histology of Domestic Animals, Part II
E39,162 : Histology of Domestic Animals, Part III
E39,163 : Fishes, Frogs & Amphibia Under the Micro.
E39,164 : Lizards, Snakes & Birds Under the Micro.
E39,165 : Protozoa and One-Celled Animals
E39,166 : Sponges, Polyps and Sea-Anemones
E39,167 : Worms and Crustaceans
E39,168 : Spiders and Insects
E39,169 : Snails, Mussels, Clams and Starfishes
E39,170 : Reproduction of Animals
E39,171 : Embryology and Development of Animals

2.) BOTANY

E38,754 : Roots and Stems of Flowering Plants
Bean, dicot root, t.s.; Corn, typical monocot root, t.s.; Spruce, root t.s.; Hyacinth, root t.s.; Lime, woody root, t.s.; Fir, t.s. of woody branch with resin ducts; Sunflower, typical dicot herbaceous stem, t.s.; Sedge, stem with bundles, t.s.; Apple, 1 yr. twig with vascular bundles & cambium, t.s.; Grapevine, older woody stem with cork & medullary or pith rays, t.s.
E39,172 : Leaves and Needles of Flowering Plants
E39,173 : Flowers and Fruits of Flowering Plants
E39,174 : Fungi, Mushrooms & Algae Under the Micro.
E39,175 : Liverworts, Mosses & Ferns Under the Micro.
E39,176 : Bacteria - Simple Organisms
E39,177 : Tropical Plants Under the Microscope
E39,178 : Reproduction and Propagation of Plants

3.) CELL STRUCTURES

E39,179 : The Wonderful Structure of the Animal Cell
E39,180 : The Wonderful Structure of the Plant Cell
E39,181 : Growth and Reproduction of Cells

4.) INSECT LIFE

E38,755 : Insects & Other Arthropods Under the Microscope
Articulate leg of millipede; Spider, abdomen, t.s.; Plant lice, w.m.; Walking stick t.s.; House fly, head, w.m.; Ant, head with mouth parts, w.m.; Cockroach, Intestine, t.s.; Springtail, w.m.; Larva of May fly, w.m.; Tracheal tubes of insect showing elastic spiral thread
E39,182 : Life & Microscopic Structure of the Honey Bee

5.) MICROORGANISMS IN THE WATER

E38,756 : Wonderful World in a Drop of Water
Diatoms, many different forms of shells; Euglena, green flagellate; Paramecium, ciliates from hay-infusion; Daphnia, water flea; Cyclops, a copepod, w.m.; Desmids, mixed species; Mixed plankton from fresh water; Hydra, t.s. through the body of a coelenterate; Planaria, t.s. t of a flatworm; Bacteria from putrid water, forming chains, stained smear
E39,183 : Life in the Sea and on the Beach
E39,184 : Excursion in a Village Pond
E39,185 : Excursion on the Banks of a River
E39,186 : Life in Rivers and Brooks

6.) MEDICAL SCIENCE

E38,757 : Healthy Human Tissues, Part I
Human blood smear with red & white blood cells; Human mouth, isolated epithelial cells; Human striated muscle, t.s.; Human cerebrum, t.s.; Tonsil with lymph nodules, t.s.; Human lung, t.s.; Human skin, t.s.; Human stomach, t.s.; Human red bone marrow, with developing blood cells; Human testis, t.s.
E39,187 : Healthy Human Tissues, Part II
E38,758 : Diseased Human Tissues, Part I
Tuberculosis of the lung, t.s. with bacterial foci; Cirrhosis of liver, t.s. showing parenchyma cells between connective tissue; Leukemia of spleen, t.s. showing abundant leucocytes and young cells; Sleeping disease, blood smear with flagellates; Inflammation of the lungs, t.s. with inflammation cells around the vessels; Malaria melanemia of spleen, t.s.; Scar tissue of skin, t.s.; Eberthella typhi (thphoid fever), smear; chronic nephritis, t.s. shows displacement of tubuli by inflammation cells; Pus bacteria, smear showing cocci in irregular balls

Also Available:
E39,188 : Diseased Human Tissues, Part II
E39,189 : Parasites of Man and Animals
E39,190 : Medicinal Plants Under the Microscope

7.) VOCATIONAL TRAINING AND TECHNOLOGY

E39,191 : Textile Fibers and Textures
E39,192 : Feathers, Scales, Hairs and Furs
E39,193 : Drug Powders Under the Microscope
E39,194 : Varieties of Wood
E39,195 : Useful Plants in Agriculture

8.) FOODSTUFFS

E38,759 : Foodstuff and its Adulteration
Potato starch; Wheat flour adulterated with chalk; Rye flour adulterated with heavy spar; Corn flour spoiled with corn smut spores; Wheat bran; Cocoa powder; Cocoa, adulterated with grog; Rye flour spoiled with parts of moths; Sour milk containing chains of bacteria; Root of carrot, t.s. with carotin
E39,196 : Edible Fruits and Seeds
E39,197 : Bread and Cereals Under the Microscope
E39,198 : Luxury Foods and Spices Under the Microscope

9.) Hobby and Leisure

E38,760 : Artforms of the Microscopic World
Radiolaria, mixed species showing different forms; Foraminifera, many different forms; Diatoms, mixed species, recent from fresh water; Diatoms, mixed species, fossil from fresh water; Diatoms, mixed species, recent marine; Diatoms, mixed species, fossil marine; Eleagnus, olive tree, scale-like stellate
hairs from the bottom side of a leaf, w.m.; Scales of butterfly wing - variation of color and form; Plant stem, t.s. showing symmetrical arrangement of vascular bundles, t.s.; Flower bud, t.s. showing symmetrical arrangement of floral parts
E39,199 : Indoor Plants Under the Microscope
E39,200 : Life in the Aquarium
E39,201 : Woodland Plants and Animals
E39,202 : Pests and Parasites of the Garden and Orchard
E39,203 : Artforms of Nature : Spores and Pollen Grains
E39,204 : Ornamental Plants

10.) ECOLOGY AND ENVIRONMENT

E38,761 : Animals & Plants Damaged by Environmental Influences
Plant parts infested with plant lice, t.s.; Damaged leaves, t.s. with destroyed epidermis and chloroplasts; Damaged needles of conifers, t.s.; Plant stem damaged by game, t.s.; Wood destroyed by fungus; Skin of fish injured by chemicals; Skin ulcer of an amphib; Human lung with coal dust; Goiter caused by deficiency of iodine; Gall nut caused by lice
E39,205 : Life in the Soil
E39,206 : Identifying Polluted Water Under the Microscope

11.) SCHOOL SERIES

E38,762 : Teaching Series for Biology: Basic Set
Filamentous green alga from fresh water showing chloroplasts; Mold from bread with mycelium and sporangia; Cornflower, root, t.s.; Privet, t.s. of leaf showing palisade and spongy parenchyma; Tulip, t.s. of ovary showing arrangement of ovules; Paramecium, ciliates; Earthworm, t.s. through midbody; House fly, wing, w.m.; Frog, blood smear with nucleated blood cells; Chicken, skin of a bird, t.s. with feathers
E39,207 : Teaching Series for Elementary Science
E39,208 : Teaching Series for Biology : Supplementary Set

CYLINDER MICROTOME

• Specimens to 10 Microns • Precision Cylinder Feed-Screw

Classic mechanism cuts to 10 microns specimens from biological matter for microscope examination. Sample is held in clamping mechanism which fits inside cylinder. Precision feed knob, graduated in 10 micron increments, advances sample to cutting surface. Scalpel slices sample section. Advances 500 microns each complete turn. Wooden case, 3" diameter x 3"H x 7"L, scalpel.

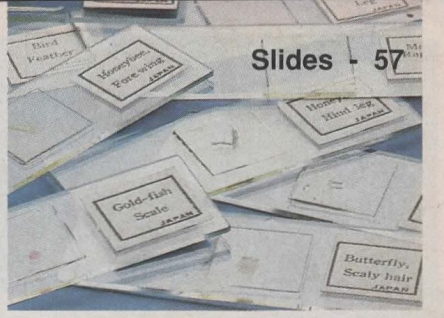
Microtome **E31,535** **$185.00**

BIOLOGICAL SPECIMEN SLIDING MICROTOME

• Ultra-Thin Specimens To 10 Microns

Fixed blade, clear plexiglass guard and sliding specimen holder for extra-safe operation. Slide the holder from top to bottom along the rail to cut extremely thin specimens. Smallest graduation is 10 microns. Feed screw advances 0.5mm per rotation. Includes 3 double sided blades (1-1/2" square). 6-1/2"L x 5"W x 5"H overall.

Sliding Microtome **E37, 331** **$230.00**



EDMUND'S PREPARED MICROSCOPE SLIDES

Each set contains 12 professionally prepared slides, 1" x 3", housed in a slotted storage box. Each slide is identified. Slides are optical glass. **$12.95 Each**
2 or More, $10.95 Each

1). Insect Organs: Wings, legs and antenna from common insects such as bee, mosquito, etc.
Insect E36,140

2). Tiny Creatures: Nature's smaller creatures such as aphids, larva, etc. **Tiny Creatures E36,141**

3). Birds & Animals: Fur, scale, feather and skin samples from common creatures such as dog, cat, chicken, canary, etc. **Birds E36,142**

4). Plants: Leaf, root and stem samples from common plants such as onion, etc. **Plants E36,143**

5). Sea Life: Scales, eggs, spicule and organs from sea creatures such as sea-urchin, sardine, sea-cucumber, etc. **Sea Life E36,144**

DELUXE EXPLORATION KIT

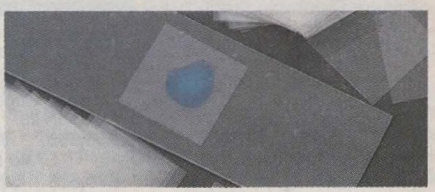
All the basic accessories required to prepare biological specimens for microscopic examination. Deluxe exploration kit includes 20 blank slides, 3 prepared slides, 3 culture slides, scalpel, needle probe, tweezers, eye dropper, cover glasses, labels, shrimp eggs, color salt powder, dry yeast, glue, eosin, methylene blue safranine dye.

Specimen Kit **E36,139** **$ 33.95**

DELUXE KIT WITH SPECIAL MICROSCOPE HAND BOOK

"Hunting With The Microscope" Ideal reference source; 125 pages; more then 50 illustrations.

Kit with Book **E70,504** **$36.95**



MICRO COVER GLASS

Finest Optical Quality. Sold by the ounce.
Each $5.95
3 or More, $5.00 Each

Thickness #1 = .13 - .17mm (.005") .

		Pcs. Per Box
E40,002	18mm	100
E38,747	22x22mm (7/8" Sq.)	156
E38,748	22x30mm	116
E39,065	24x30mm	116
E38,749	22x50mm	70
E39,066	24x50mm	70

Thickness #2 =.17 - .25mm

E38,750	22x22mm (7/8" Sq.)	116
E38,751	22x30mm	80
E39,067	24x30mm	80
E38,752	22x50mm	52
E39,068	24x50mm	52

A) 65 PIECE LABWARE BONANZA
Assortment includes test tubes, vials, measuring cups, bottles with caps, flasks, beakers, pipettes, squeeze bottles and more. Assorted sizes and quantities of each item. This is surplus but it's all brand new. Each set may differ. A super bargain.
Labware Bonanza **E35,474 $37.95**

B) 27-PIECE CHEMISTRY GLASSWARE SET
Top-quality set of heat-resistant Kimax glass. Easy to read calibrations. Easy pour spouts. Durable lips. Set includes: Five 13x100mm test tubes; Five 16x150mm test tubes; Five 18x150mm test tubes; 50ml graduated cylinder; 400ml beaker; 250ml beaker; 60ml poly dropper; two 1ml graduated pipettes; 50ml Erlenmeyer flask; 125ml Erlenmeyer flask; Boiling flask; Stirring rods. Economical set is perfect for school lab, home or industrial work and experiments.
Chemistry Glassware Set **E71,482 $69.95**

C) PETRI DISHES
Reusable Polymethylpentene Dishes. Transparent, shatterproof. Can be hot-air sterilized at 160 degrees C. 100mm diameter. 15mm high. Can be stacked. Can be autoclaved repeatedly.
Package of 10 **E35,296 $34.95**

General Lab Use Dishes. Tight seal lid. 50mm diameter. For school science experiments.
2 Packages of 20 **E35,207 $8.50**

D) DISPOSABLE/STACKABLE POLYSTYRENE PETRI DISHES
100mm diameter, 15mm height, virgin, crystal-like, optically clear polystyrene with excellent flatness tolerance. Assures distortion-free viewing. Squared top and bottom edges enable media to spread evenly. Flared lid is easy to remove. Three venting ribs minimize condensation. Sterilized by Gamma Radiation—no quarantine, no residue.
Package of 100 **E38,026 $16.50**

A) PLASTIC BOTTLES HAVE A VARIETY OF LAB USES
Store and dispense solutions, chemicals and dry powders with these handy bottles. Clear polyethylene bottles have Yorker dispensing caps. Designed to withstand temperatures up to 140°F. Three sizes. Sold in packages of 10.

1 Ounce Bottles	**E34,569**	**$9.50**
2 Ounce Bottles	**E35,326**	**$10.50**
4 Ounce Bottles	**E35,327**	**$13.50**

B) LAB WASH BOTTLES BY THE HALF DOZEN
Low density polyethylene bottle and fill tube; polypropylene screw closures and stems. Tip dispenses uniform stream; can be cut back to increase flow. One piece closure and stem for leakproof service. Sold in packages of six.

2 Ounce Bottles (60ml)	**E35,201**	**$12.50**
4 Ounce Bottles (125ml)	**E35,202**	**$14.50**
8 Ounce Bottles (250ml)	**E35,203**	**$15.50**

C) PLASTIC LAB BOTTLES WITH VIEW STRIP
Clear view strip on side of these plastic bottles allows you to see the remaining quantity. With caps. Perfect for mixing chemicals, storing concentrates, photo developing supplies, etc. Sold in packages of six.

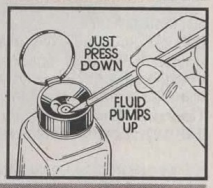
12 Ounce Bottles	**E35,252**	**$5.25**
16 Ounce Bottles	**E35,253**	**$6.50**
1 Liter Bottles	**E35,254**	**$9.25**

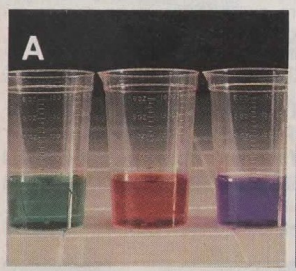
D) PRECISION PUMP SOLVENT DISPENSERS
A press of the top and the fluid pumps up. Dispenses only what you want, when you want. No excess fumes, no spilling, no dripping. Air-tight check valves stop evaporation. Stainless steel pump unit. Linear polyethylene bottle. With label set.American-made.
$14.50 Each
6 or More, $12.75 Each

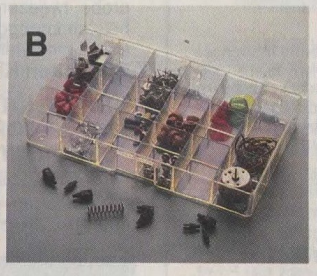
4 Ounce Bottle	**E35,249**
6 Ounce Bottle	**E35,250**
8 Ounce Bottle	**E35,251**

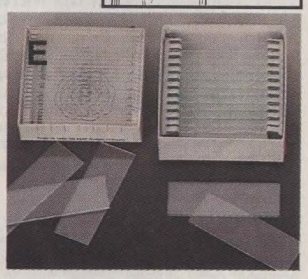
Pump with Special Bottles. Four ounce capacity.
$14.50 Each
6 or More, $12.75 Each

Amber Glass Bottle	**E36,298**
All-Metal Container	**E36,299**









A) HANDY PLASTIC CUPS FOR MIXING AND MEASURING
Disposable, budget-priced cups have numerous uses in any laboratory, school, industry or home. Cups are marked in both English and metric. Non-spill lip.

1 oz. Cups. (Pkg. of 100)	**E60,365**	**$7.50**
Four or More Pkgs.		**$7.00 Each**
6 oz. Cups (Pkg. of 100)	**E70,625**	**$21.95**
Four or More Pkgs.		**$19.95 Each**

B) STORAGE BOX
Display/storage case is ideal for small optics. Clear plastic with snap-on cover allows you to view contents. 18-compartment box is 11"Lx6-1/2"Wx1-3/4"deep. Compartments are 2"Lx1-3/4"Wx1-3/4"Deep.
E35,764 $7.75 3 or More Boxes, Each $7.25

C) SNAP-LID MEASURING CUPS/CONTAINERS
Heavy-duty polypropylene containers with snap-lids are ideal for mixing and storing small solutions. Each container has ounce scales (1/4 oz. increments) and ml scales (10 ml increments). Packaged 25 containers with lids per set, 4-1/2 oz. or 8 oz.

4-1/2 Oz. Cup	**E37,665**	**$7.95**
8 Oz. Cup	**E37,666**	**$9.95**

D) SAFETY GOGGLES
Protect against flying particles, chemical splash and dust. Optical quality Lexan polycarbonate lenses. Soft vinyl frame with four plastic ventilators for indirect ventilation. Lenses can be removed for cleaning or replacement. Distortion-free. Clear lenses and frame. With rubber headband.
Safety Goggles **E35,166 $4.50**

E) MICROSCOPE SLIDES

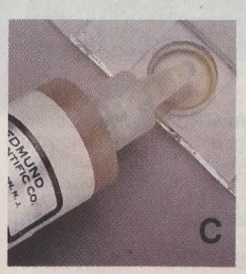
A. Plain Microscope Slides
72 optical quality glass slides, 1" x 3" each. 1.0mm thick.
Microscope Slides **E40,001 $5.95**

B. Well Slides
Two depressions on each slide protect specimens, or use with live water cultures. 1"x3". 1.3mm thick. Package of 12.
Well Slides **E30,091 $23.95**

C. Superfrost Slides
72 slides - 25 x 75mm. Superfrost end - 1mm thick.
Superfrost Slides **E38,746 $13.95**

MAKE YOUR OWN SLIDES
A) Basic Slide Making Kit: All you need to make professional slides. 24 blank glass slides, 24 labels, 24 cover glasses, glue and eosin (red) dye.
Make Your Own Slide Kit **E36,138 $16.95**

B) ES SPECIMEN STAINING SET
A special set for making biological slides which require staining to enhance tissue, feathers, bone, etc. 11 blank slides, 1 well slide, 12 cover glasses, glue, labels, eye dropper and dyes, eosin (red), methylene blue, safranine, and fast green.
ES Specimen Staining Kit **E36,186 $19.95**

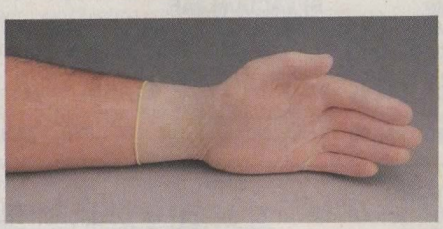


C. Balsam Mounting Fluid For Slides.
Package of 3 bottles, one ounce each. Child-proof caps for safety.

Balsam Mounting Fluid (3ozs.)	**E35,224**	**$7.95**
****Relaxing Fluid (A30) 1 oz. jar**	**E38,743**	**$3.95**
****Relaxing Jar 1 oz. jar.**	**E38,744**	**$3.95**
****Dispatching Fluid 1 oz. jar**	**E38,745**	**$3.95**

DISPOSABLE LAB APRONS
Aprons are made from .03mm gauge flame resistant white polyethylene. Measure a full 24" x 42". Each one-piece, die cut apron has a loop neck and broad polyethylene string ties. Useful for hobbyists, gardeners, workshop tinkerers.
Package of 100.
E31,946 $32.95

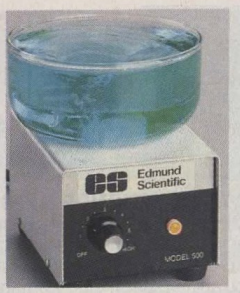
HEAVY DUTY ACID RESISTANT APRON
Protective green apron of 20-mil virgin vinyl. 50" long for full torso protection. Ideal for the lab.
Pkg. of 2.
E36,019 $11.95



DISPOSABLE, SENSITIVE LATEX SURGICAL GLOVES
Sheer white natural Latex, just 5 mil thick, gives these ambidextrous disposable gloves surgeon-like touch for precision assembly applications. Seamless gloves feature an easy-on rolled wrist design and are available in two sizes. White powdered, acid/alcohol/alkaline resistant. Length 9". 100 gloves in each dispenser box. **$19.95 Each box**
Small Size E36,092; Large Size E36,093

DISPOSABLE CLEAR PLASTIC GLOVES
Polyethylene gloves resist oils, chemicals, detergents and more. Provide affordable protection for those handling irritating products. Durable, flexible, easy to use and long-lasting. In two convenient sizes. Useful in the office, lab or around the house. Package of 100.

Medium Size	**E60,317**	**$7.95**
Large Size	**E60,321**	**$7.95**



MAGNETIC STIRRER
Electronic speed-controlled stirrer from 60 to 2,500 RPM. Designed for hours of continuous stirring with little speed deviation, minimal heat build-up. Pilot light. Stirs up to 2 liters of water, 400 ml of 100% glycerol @ 20°C. 5-1/2" x4" x3-1/2" overall. 5-1/2" x4" (21 square inches) plate. 50W, 120V with 6 ft., three-prong cord and grounding plug. With 1-1/2" coated stirring bar. Wt: 2 lbs., 10 oz. **Magnetic Stirrer E36,284 $135.00**

HOT PLATE
Heats to 700° F surface temperature in 20 minutes. Cast aluminum top plate for even heat distribution. Corrosion-resistant, stainless steel housing. Aluminum base with non-slip rubber feet. Adjustable thermostatic control. With pilot light. 4.1" x5.4" x4.9" overall. 4.1" x5.2" (22 square inches) top plate. 325W, 120VAC. With 6 ft., three-prong grounded cord and plug. Wt: 3 lbs.
Hot Plate E36,285 $115.00

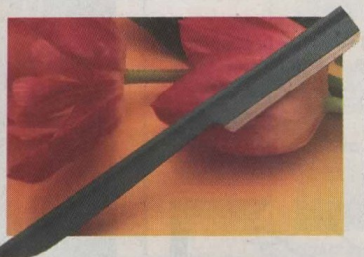
MICROSCOPE IMMERSION OIL
• Index Of Refraction nd23° C 1.5150
Resolve™ is a blend of synthetic hydrocarbons and advanced polymers. A stable non-drying, non-hardening fluid. Safe to use with valuable optics and irreplaceable slide specimens. Colorless appearance allows maximum light to pass. Can be used with fluorescence procedures. Squeeze tube dispenser with a 1" long nozzle. Safe—No PCBs. All components have undergone extensive toxicity testing and have been found to pose no health hazzard. Easy to remove from slides and to clean from microscopes.

1/2 oz. Dispenser Tube-Low Viscosity—150 cs	**E38,502 $4.50**
1/2 oz. Dispenser Tube-High Viscosity—1250 cs	**E38,503 $4.50**
16 oz. Bottle-Low Viscosity—150 cs	**E38,504 $22.95**
16 oz. Bottle-High Viscosity—1250 cs	**E38,505 $22.95**

CYTOSEAL™ MOUNTING MEDIUM
Advanced acrylic resin will not crack, discolor or yellow with age. Dries rapidly. Can be used with oil immersion objectives and fluorescent procedures. Can be dissolved in toluene or xylene. An antioxidant has been added to prevent fading of slides. CytoSeal™ 60, primarily for use with cover glass, allows the rapid, even spread of medium and eliminates air bubble entrapment. 4 oz. dispenser top bottle.

60 cps-Low Viscosity	**E38,506**	**$14.95**
280 cps-High Viscosity	**E38,507**	**$14.95**

HEAVY DUTY RUBBER GLOVES
Butyl rubber gloves are just the protection you need in the lab or workshop. Excellent hand protection while painting, plastering or washing the car. Heavy duty. 14" long. Unlined. One size fits all. Black only. One pair.
Laboratory Gloves
E34,749 $6.50



DISPOSABLE RAZOR KNIVES
So inexpensive that you can discard them when they become dull. Sharp 2" single blade is housed in metal handle. 5" overall. For industrial and hobby use. Sharp.
Pkg. of 50 Blades E70,369 $13.95
Two or more Pkgs., Each $12.95

A) PORTABLE BUNSEN BURNER (Not Pictured)
Burns for over 7 hours on one fuel container. Fingertip control for soft flame or hot blast. Disposable containers. Uses specially blended butane fuel.

Burner	**E71,556**	**$27.95**
Fuel Refill	**E41,672**	**$6.95**
Flame Spreader.	**E41,673**	**$6.25**

B) TEST TUBE RACKS

Six Tube Capacity Rack Wood	**E35,230**	**$6.95**
Ten Tube Capacity Rack Wood	**E35,231**	**$10.95**

C) GUM RUBBER TUBING
15 foot spools.

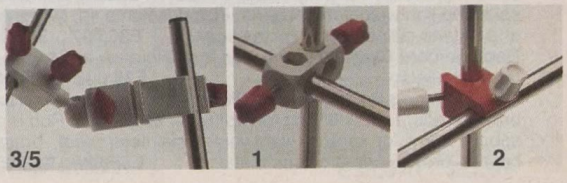
3/16"	**E35,232**	**$13.95**
1/4"	**E35,233**	**$17.95**

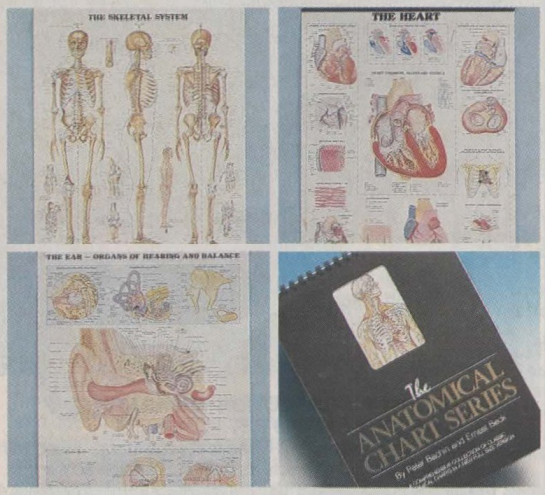
LABORATORY CONSTRUCTION APPARATUS
A. LABORATORY BASES/FEET
Glass fiber reinforced nylon. Chemically resistant. Filled with resin-bonded shot which acts as ballast. Tension screw .
1. Large Vee Lab Base 9"(230mm)x9"(230mm) , weighs 4.4 lbs.(2kg.). 1/2"(13mm) dia. rod hole . **E38,852 $33.00**
2. Small Vee Lab Base 4.8"(123mm) on a side and weighs 2.2 lbs(1 kg.) **E38,853 $26.00**

B. LATTICE RODS 1/2" (13MM) DIAMETER
Stainless steel, resistant to most chemicals. 1/2"(13mm) dia. and are hollow to reduce weight.. Rods to be used in Vee base or in a lattice array, using lattice supports and clamps.

6"	**E38,854**	**$10.00**	**10"**	**E38,855**	**$13.00**
20"	**E38,856**	**$15.00**	**23"**	**E38,857**	**$20.00**
29"	**E38,858**	**$19.00**	**39"**	**E38,859**	**$26.00**

C. CLAMPS OR JAWS - 3 SIZES
1. Small Clamp. Fixed screw action. Opens to 5/8"(16mm) for thermometers, rods, burettes. Closes completely which gives a firm grip on wires, etc. Stem is 1/4"(6.4"mm) dia.x5"(125mm)L. **E38,860 $15.00**
2. Medium Clamp. Fixed screw action. Opens to 1-3/4"(45mm)for tubes, flasks, etc. Closes into complete contact with the two jaw faces for a firm grip on wires, etc. Stem is 3/8"(9.5mm) dia.x6"(150mm)L. **E38,861 $19.00**
3. Large Clamp. 2 moving Jaws . Opens to 3-1/3"(85mm) for beakers,etc. Closes to within 1/8"(3mm) of contact with the two jaw faces. 3/8"(9.5mm)dia.x6"(150mm)L. **E38,862 $23.00**
D. Non-Slip Tape
When applied to the jaws of clamps and other holders, improves the grip on slippery, heavy or delicate apparatus. Sticky on one side 5/8"(16mm)W; 39"(1 meter)L. **E38,863 $6.50**
E. ROD CONNECTORS
1. Closed Connector
Pierced so that two rods, clamp stems or male connectors can pass completely through it simultaneously either vertically or horizontally and be locked in place by thumbscrews. **E38,864 $4.75**
2. Open Sided Connector
Two open sides takes rods and locks them in place with thumb screws at right angles to each other. Mounts two rods at right angles or mounting a clamp stem horizontally on a vertical lattice rod or laboratory stand. **E38,865 $6.50**
3. Tee Connector
Mount clamps and adapters that have a male connector to vertical lattice rods or laboratory stands. One end has an open side that will clamp on a rod and lock with a thumbscrew. The opposite end has a female socket 3/4"(19mm) deep that will take a male connector, or the butt end of a rod. **E38,866 $6.50**
4. Ball Joint Camera Adapter
Carries a base plate disc and threaded stub with a 1/4"(6mm) Whitworth thread, camera mounting thread. Can be mounted on any lattice by means of the male connector on the bottom of the adapter and the camera can be located anywhere in a full hemisphere. Holds jigs. **E38,867 $24.50**
5. Ball Joint Adapter
Solves difficult mounting problems. Ball joint is mounted on a rotating base. Wing nut operates a heavy cam that locks the work in place with a half turn. At each end there is a male connector for mounting the adapter on lattices or stands and for holding at the other end any of the Stronghold clamps. **E38,868 $21.00**
6. Hinge Adapters
Female to female hinged adapter. The female socket accepts butt end any rod. Tab-ends carry a stainless steel bolt and a star nut, which allows them to be locked in place in any position from in line 90° in either direction. Including the rotation of the fixed member about itself, the hinged section can be located & locked anywhere within a full hemisphere. **E38,869 $14.50**





BACHIN/BECK ANATOMICAL CHARTS

Outstanding color illustrations, precise human anatomy and modern medical terminology are the trademarks of these famous medical illustrators. Each chart provides the most current information available to scientists today. Ideal for classroom, laboratory or family education.

A. 11" x 14" Spiral Notebook Study Guide. Features 25 basic anatomy charts printed on high quality heavy paper and bound in a rugged spiral notebook. Includes: Skeletal System, Vascular, Muscular, Nervous, Lymphatic, The Heart, Brain, Teeth, Skin, Kidney, Female Reproductive, Male Reproductive, The Eye, Ear, Liver, Vertebral Column, Digestive System, Respiratory System, Human Spine-Disorders, Pregnancy & Birth, Head and Neck, Endocrine System, Ulcers, Infertility and Cancer.

Anatomical Notebook Study Guide **E36,304 $39.95**

B. Poster Size 20" x 26" Individual Charts. Printed on high quality heavy paper with black metal trim on the top and bottom. Brass loop for easy wall hanging. **$11.95 Each**

The Heart	**E36,305**	**Pregnancy & Birth**	**E36,310**
The Brain	**E36,306**	**Respiratory System**	**E36,311**
The Ear	**E36,307**	**Digestive System**	**E36,312**
The Eye	**E36,308**	**Muscular**	**E36,339**
Skeletal System	**E36,309**	**Vascular**	**E36,340**

MINIATURE BUTANE TORCHES

A) Pocket Micro Torch. Only 3" tall, this state-of-the-art piezo electric ignition torch features wind-proof flame and water-proof ignition. Attachable base stand for hands free work. Protective safety cap is chain-tethered to prevent loss. A handy tool for electronic repair, laboratory use and general mechanics. Operates on butane. Refillable. 3.8 gram capacity (18-23 minutes burn time). 1300°C flame temperature.

Special Introductory Offer Butane Torch **E37,656** **$49.95**
Butane Gas Refill. 9 oz. Pkg. 4. **E37,744** **$15.95**

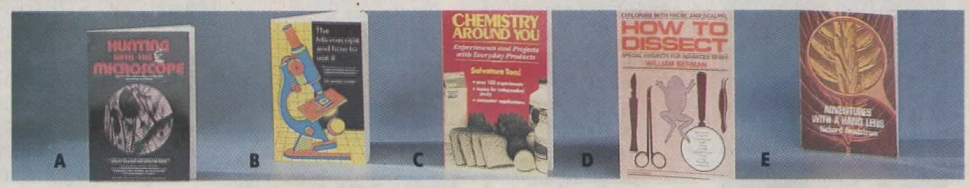
B) Piezo-Electric Ignition Torch. Micro Torch ignites at the push of a button to provide high temperature flame up to 1300°C (2500°F). Features refillable butane gas chamber, precision flame/temperature control, all-brass construction, cushioned rubber grip, base stand and piezo ignition system. 5-1/2" high, capacity 26 grams (approximately 2 hours burn).

Micro Torch **E34,972** **$64.95**
Butane Gas Refill. 9 oz. Pkg. 4. **E37,744** **$15.95**

C) 5000°F Microflame Torch. Palm-size microflame torch provides instantaneous and precise heat only where it is needed. 5000°F (2760°C) fine point flame. Perfect for brazing and silver soldering lightweight metal parts. Includes flame tip, Micronox and Butane cylinders and instructions. **E35,697** **$19.95**

Replacement Cylinders. Includes four Micronox and two Butane cylinders. **E35,698** **$9.95**

Silver Brazing Rods and Flux Tube. Includes 12 silver alloy brazing rods, 1/32" x 6" and tube of silver solder flux. Rod is of special alloy for brazing lightweight stainless steel, brass, copper, bronze and precious metals. **E35,699** **$12.95**



EDUCATIONAL "HOW TO" SCIENCE AIDS

A) Hunting With The Microscope. The perfect introduction to the microscope. Discusses the selection of a microscope and describes procedures for using it to examine a wide variety of plant and animal specimens. 137 pages. More than 50 illustrations. **E9207** **$5.25**

B) "The Microscope And How To Use It." by Dr. Georg Stehli. Learn how to use a student microscope and to examine simple objects. Step-by-step techniques, careful instructions with safety in mind. Learn to detect fat, use the oil-immersion objective, dye bacilli spores, do microphotography, cut sections with a microtome. This book provides all the help students need. **E9848** **$4.25**

C) "Chemistry Around You" by Salvatore Tocci. Experiment and analyze the chemicals in a multitude of everyday home products. Divided by sections of the house—Written with safety in mind. A student needs only commonly available equipment to perform these experiments. Fully illustrated, 186 pages. **E9702** **$8.25**

D) "How To Dissect" by William Berman. The perfect introduction to the art of dissecting. 214 pages. 821 step-by-step procedure illustrations. Explore with probes and scalpels beginning with the earth worm and progress to more complex anatomies such as a grasshopper, starfish, perch, and ultimately a fetal pig. Plus special projects for advanced study. **E9726** **$8.25**

E) "Adventures With A Hand Lens" by Richard Headstrom. With an ordinary magnifying glass and this book as your instruction & answer guide, 50 adventures in close observation await you. 209 exact line drawings. 50 "lesson plans" —observe flowers, grasses, fish scales, moth & insect wings, egg cases, buds, feathers, seeds, leaf scales, molds, ferns, crystals, etc. **E4208** **$4.50**

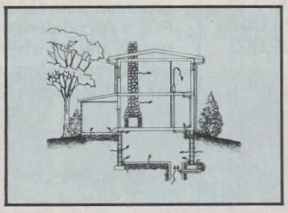
A) HAND HELD VACUUM PUMP
Pump has 2 feet of 1/4" tubing; 1-5/8" diameter gauge registers 0 to 30" of mercury; 5" lifter, 2-1/2" dia. cup. Size 7" x 4"
Vacuum Pump **E71,301** **$43.95**
Pump (without gauge and lifter) **E71,300** **$28.95**

B) VACUUM JAR
Clear bell jar with gasketed, polyethylene base and permanent, fused-in 1/4" tubing connection. Jar: 9" x 6-3/8" I.D. Base: 1/2" x 7-1/2" diameter. Neoprene gasket: 3/21" x 7" diameter; 1/2" center hole. **Vacuum Jar** **E71,338** **$79.95**

pH PAPER INDICATORS

pH Papers permit the determination of the pH of solutions. The carrier is a high quality absorbent filter paper. The indicators change color through a chemical reaction. Colors differ depending on the specific pH value. Round Dispenser: MN Universal Indicator: pH graduation 1.0/2.0, 1-14, 16-1/2" long with color scale.

pH Paper Indicators **E36,300** **$8.50**
Refills for above (Box of 3) **E36,301** **$9.95**

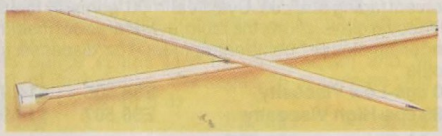


HOME TEST RADON GAS DETECTOR

• Meets EPA Proficiency Test

Basic test to identify if you have a radon gas problem in your home. Features a diffusion barrier, charcoal absorption system, the most sensitive and accurate technology available today. Kit includes test detector, mailer, lab analysis, confidential results report and informational pamphlet. A very safe and easy test to use. Since radon is both odorless and colorless, measuring radon levels with a kit such as this is one way to determine if a house is safe. Simply collect dust particles in different areas of the house, then send the samples to the lab for testing

Radon Test Kit **E37,483** **$21.50**



HEAT PIPE SPIKE

Capillary action recycles fluid sealed in copper tube which vaporizes & condenses. Stainless steel body houses copper lines. 14-5/8" long. Solid aluminum head. Operates between 300-450°F.

Heat Pipe **E35,255** **$5.75**
10 or More, $3.50 Each
Heat Pipe Idea Book **E9897** **$1.50**

PLASTIC COATED CHEMICAL PREDICTOR

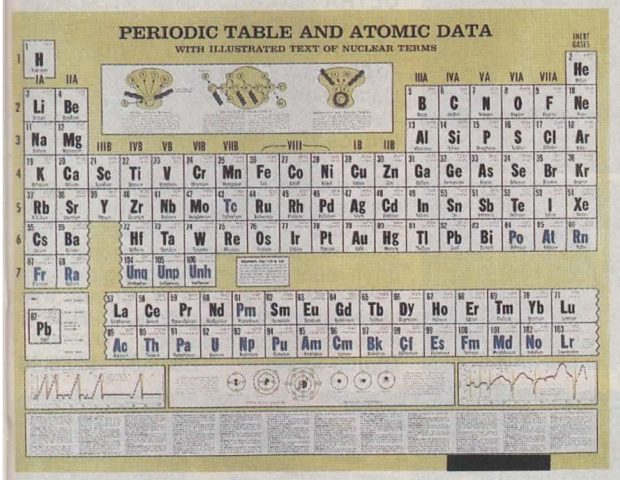
Two charts of equations can be matched to provide the answer to 30,000 chemical reactions. Numerical data shows if a reaction can occur, its extent and its products. 5-1/2" x 11". **E40,752** **$5.50**

THE HUMAN SKELETON

• Articulated Adult Human Skeleton
• Stands 5'3"

Life size plastic skeleton for teaching and educational demonstration purposes. Durable plastic with the color and general appearance of real bone. The arms and legs are removable for individual study. The skull, with 32 teeth, is dissectable into 3 parts with the mandible on springs. Mounted with a metal rod which extends from the sacrum. Complete with a, zippered dust cover, skeletal system chart, and a mobile stand with wheel-based platform. Stands 5'3".

Human Skeleton
E37,746 **$425.00**



ATOMIC WALL CHART

• Compiled To New Carbon 12 Standard
• Includes Element 103, Lawrencium

Chart explains and diagrams radioactive isotopes, solar energy, hydrogen bomb reaction and atom bomb fission. Gives atomic weights and number of electrons in each orbit. Illustrates typical atomic structure, describes protons, neutrons and nuclear principles. Features graphs of recurring properties of the elements. Defines dozens of nuclear terms which, when combined with other chart data, provide a basic education in atomic theory. Beautifully illustrated in four colors. Large 32" x 45" size makes an impressive addition to laboratory or science classroom. Individually packed in mailing tube. Choose heavy chart paper or Kimdura plastic.

Varnish Coated Heavy Chart Paper E36,964 $11.50
Kimdura Plastic Wall Chart E36,965 $19.00

ALL PURPOSE SPOUT WASH BOTTLES

Durable, low-density polyethylene bottles are flexible, translucent and chemical-resistant. May be used up to 80°C.

A) Color Coded 5 Piece Sets. Each set contains one each: white, red, yellow, green and blue.

Capacity	Stock No.	Price
1,000 ml	E37,667	$14.00
750 ml	E37,668	$13.00
500 ml	E37,669	$11.00
250 ml	E37,670	$10.00
125 ml	E37,671	$9.00

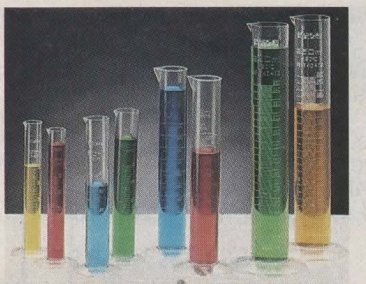
B) Labeled And Color Coded 4 Piece Sets. Each set contains one each: white/water, red/acetone, green/methanol, blue/isopropanol. Large letter label and appropriate safety warning level.

500 ml E37,673 $13.00
250 ml E37,672 $12.00

INTEGRAL TUBE WASHBOTTLES

These polyethylene bottles have an integrally-molded tube with a removable jet tip and a separate plain cap. Specially molded in one piece to eliminate seam leakage. The shape is a squared oval for easy grip and improved stability. Fill line marked. Heat up to 80°C. Two sizes available, in clear or red.

Color	Capacity	Pkg. Qty./ Stock #/Price	Pkg. Qty./ Stock #/Price
Clear	250 ml	(6)/E36,831/$12.50	(24)/E37,075/$39.00
Clear	500 ml	(6)/E36,832/$13.50	(18)/E37,076/$34.00
Red	250 ml	(3)/E37,077/$7.75	(24)/E37,078/$40.00
Red	500 ml	(3)/E37,079/$7.75	(18)/E37,080/$39.00



GRADUATED CYLINDERS

Produced of polymethylpentene (P.M.P.); able to withstand 180°C continuously. Highly transparent; easily readable graduations; resistant to tipping. Available in 2-piece packages or by the case.

Capacity	Divisions	2 Pc.Price/SN	CasePrice(Pcs.)SN
25 ml	0.5 ml	$7.00 /E37,525	$34.00 (12)/E37,036
50 ml	1 ml	$7.50 /E37,526	$36.00 (12)/E37,038
100 ml	1 ml	$10.50 /E37,527	$27.00 (6) /E37,040
250 ml	2 ml	$13.50 /E37,528	$36.00 (6) /E37,042
500 ml	5 ml	$18.50 /E37,529	$25.00 (3) /E37,044
1 liter	10 ml	$24.00 /E37,530	$35.00 (3) / E37,046

LONG NECK DISPENSER BOTTLES

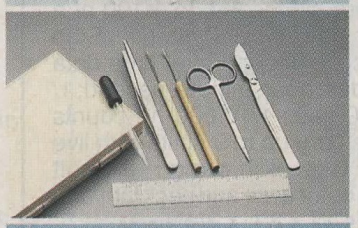
Use for precise dispensing by drop. Airtight at normal pressures. White polyethylene threaded caps. Translucent. May be heated up to 80°C. Long neck; captive cap. Two sizes available, in packages of 12.

30 ml Dispenser Bottle (Pkg. of 12)
E37,062 $7.50
60 ml Dispenser Bottle (Pkg. of 12)
E37,063 $8.50

SEVEN PIECE DISSECTING KIT

Includes scalpel, scissors, tweezers, section lifter, dissecting needle, six dissecting pins and glass eye dropper. Comes in handy vinyl storage pouch. For biology, botany and research work.

Dissecting Kit Regularly $14.95
E31,191 On Sale $10.95



ELEMENTARY DISSECTING KIT

Designed for elementary, junior and senior high school students. Comes in hinged case with snap cover and insert for seven instruments. Kit contains 6" chrome replacement blade scalpel, 4-1/2" stainless steel dissecting scissors, 4-1/2" chrome-plated forceps, straight dissecting needle, bent dissecting needle, pipette and 6" ruler.

Elementary Dissecting Kit E36,317 $12.95

INTERMEDIATE DISSECTING KIT

Designed for senior high biology, advanced biology and comparative anatomy students. High-quality, opaque, hinged case with snap cover and compartments for 10 instruments. Kit contains 6" chrome replacement blade scalpel, 1-1/2" stainless steel narrow blade scalpel, 5-1/2" stainless steel sharp/sharp scissors, 4-1/2" stainless steel straight iris scissors, 5-1/2" stainless steel thumb forceps, 4-1/2" chrome curved medium point forceps, 6" chrome probe and seeker, 6" ruler, straight dissecting needle, bent dissecting needle, dropping pipette and six assorted scalpel blades.

Intermediate Dissecting Kit E36,104 $32.95

10 VACU-PACK ODORLESS SPECIMENS

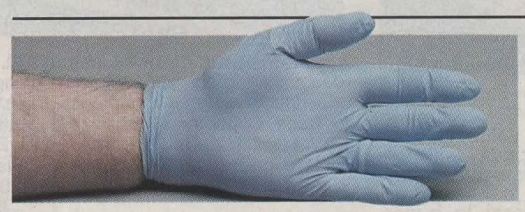
Our zoology set consists of 10 medium-size specimens vacuum packed in a special vapor barrier plastic bag. They are truly odorless and non-toxic. Includes: grantia sponge, crayfish, hydra, starfish, honeybee worker, clam, earthworm, perch, grasshopper, grass frog.

Vacu-Pack Specimens
E36,316 $9.95

NATURE SPECIMEN ASSORTMENT FOR DISSECTING

Assortment includes nine large specimens packed in a jar: crayfish, frog, grasshopper, perch, starfish, earthworm, clam, grantia sponge and beetle. Preserved in Arborstat.

Jar of Specimens E71,645 $13.95



THE NEXT BEST THING TO WEARING NOTHING AT ALL, INCREDIBLE GLOVE COMFORT

N-DEX™ gloves are a mere .004"ga. thin and chemically resistant and provide better puncture and abrasion resistance than other medical gloves. Soft, cool, featherlight, allowing for extreme sensitivity and hand dryness. Lightly powdered with non-talc, vegetable starch (non-sterile).

$19.95 Box of 100 **Medium** E39,229
Large E39,230 **Xtra-Large** E39,231

NIKON MICROSCOPE STAGE

140 mm diameter stainless steel base and stage surface, stage travels over base in any planar direction approximately 3/4". Precision gliding movement. Two slide clips. 40 mm center hole. 79 mm diameter x 7 mm deep mounting rim on base. (Nikon #77770).

Microscope Stage
E36,070 $22.95

THREE EVENT COUNTDOWN TIMER

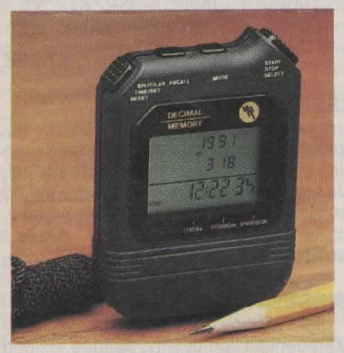
LED timer lets you time three activities at once. Ideal for use in chemistry or photography laboratories. Each timer can be programmed from one second to 10 hours. Separate read-outs for hours, minutes, seconds. When timer reaches zero, it sets off a light and sound alarm. All three channels can be programmed at once. 3" x 3" x 2". From West Bend.

3 Event Timer **E34,329 $36.95**

SINGLE EVENT COUNTDOWN/COUNTUP TIMER WITH FULL DIGIT KEYPAD

LCD display timer counts down from 99 minutes, 99 seconds and counts up to 60 minutes by the second. Loud 1-minute duration alarm for countdown. Full digit keypad for easy setting. Powered by single 1.5V button battery, included. Timer has 3-way mount; snap-clip, magnet and table stand.

Countdown/Countup Timer **E37,674 $22.95**

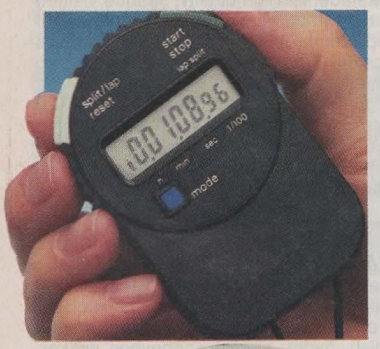


STOPWATCH/CHRONOGRAPH

- **Lap Function/Split Function Stopwatch**
- **1/100 Second Chronograph**

A multi-function stopwatch plus a chronograph displaying 24 hour digital time to 1/100 of a second and year, day, date information. Stop watch displays split, lap and total time data together in 4 modes: hour, minute, second; 1/1000 min.; 1/100 sec.; 1/10,000 hr. counts and stores in memory up to 9 splits with live memory review. High tech design with soft touch rubberized outer case and neck lanyard. Dimensions 2-1/4"W x 3"L x 3/4"T.

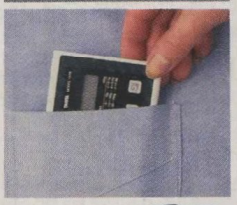
Stopwatch/Chronograph **E39,157 $28.95**



PROFESSIONAL 1/100 SECOND STOPWATCH

7 digit LCD display reads to 1/100 second and has range up to 9 hours, 59 minutes, 59.99 seconds. Full stopwatch functions with split or lap mode. Beep confirms each button push for confidence. Uses one 1.5V G-13 button battery, included. Unit measures 3-3/8" long x 2-1/4" wide x 3/4" thick. Includes neck lanyard and weighs only 1.6 ozs.

Stopwatch **E37,675 $23.95**



ULTRA-COMPACT DIGITAL SCALE

- **0.1 Gram Resolution**
- **6-1/8"L x 3"W x 1/2"T Overall**
- **100 Gram Capacity**

Convenient calculator-size digital scale fits into your pocket and provides sensitive readings from 100 gram maximum to 0.1 gram minimum. Features 3/8" LCD display with auto shut-off (3 min.) and battery replacement signal. Off, on and tare controls so you can isolate container/dish weight for chemical or grain measurement. Weighing platform measures 4"L x 2-3/4"W. Comes with vinyl slip-cover. Powered by 3-LR44 alkaline batteries (included).

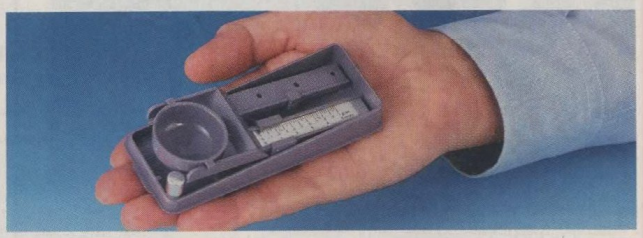
Digital Scale **E38,487 $259.95**

MICRO BEAM™ BALANCE

Convenient pocket size balance is five times more sensitive than the convenient triple beam. Fits into a 6" x 3" x 1-1/4" carrying box. Weighs items from 1/50 gram to 116 grams (4 ounces). With zero adjust. Make sensitive measurements anywhere. Metal and plastic. With 50 gram poise weight. Weighing cup included.

Calibration: 0.02 grams **Sensitivity:** 1/50 gram (20mg)
Capacity: 116 grams (4 ounces)

Micro-Beam™ Balance **E36,027 $48.95**



CARRY-WITH-YOU TWIN BEAM BALANCE

Combines the accuracy and dependability of a multi-beam design with a thin, compact, pocket-size unit. Fast set-up: remove dust cover and weigh. No assembly required. 4-1/2" x 1-3/4" x 4/5". Plastic with aluminum peg weight.

Capacity: 4 grams **Sensitivity:** 1/20 gram
Calibration: .025 grams

Calibron Twin Beam Balance **E36,028 $26.95**

ELECTRONIC DIGITAL SCALE

- **0.1 Gram Resolution**

Exceptional accuracy and excellent value for lab, industry or home. 225 gram/8 oz. capacity with 0.1 gram resolution. AC or 9V battery (not included) operation for complete portability. Full capacity tare function, auto zero, auto off, and gram to ounce conversion. Front panel LCD display with on/off membrane switches. One year manufacturers warranty. AC adapter included. Beige color.

Capacity: 225 Grams/8 Ounces
Graduation: 0.1 Grams/0.01 Ounce
Accuracy: 0.15%
Dimensions: 7.2" x 5.6" x 2.1"
Platform Size: 4.8" Diameter/Concave

Digital Scale **E38,040 $199.00**

A) ALL-PURPOSE STAINLESS STEEL SCALE

Ideal for filling operation, checkweighing, or packaging. A dependable scale for laboratories, industry or stores. Legal for trade. **Capacity:** 99.95 oz.; **Resolution:** 0.05 oz.; **Display:** 4 digit, 1/2" H red LED; **Tare:** side-mounted pushbutton; **Dimensions:** 7-1/2" Wx7" Dx2-3/4" H, Platform 6-3/4"x5-1/4"; **Weight:** 3.5 lbs.; **Power:** 110VAC with 6' cord.

E37,741 $359.95

B) DIGITAL PORTION CONTROL SCALE

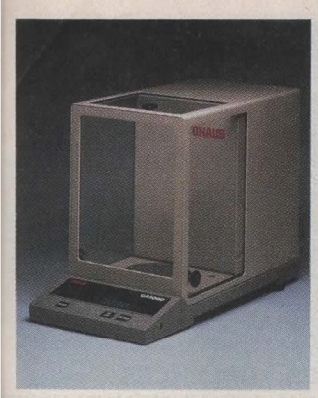
Ideally suited for home or hospital when fast accurate method of food portioning is desired. Designed for continuous use with easy-to-keep-clean features. Automatic off mode after 2 minutes of non-use. Metal base, oven baked enamel finish, stainless steel platform. **Capacity:** 70 oz. or 1998 selectable; **Resolution:** 0.1 oz. or 2 grams; **Display:** 1/2" H liquid crystal; **Tare:** keypad zeros with empty container; 7" Wx7" Dx2-3/4" H, Platform 5-1/4"x6-3/4"; **Weight:** 4 lbs.; **Power:** 4 "AA" batts. (not incl.).

E37,740 $199.95

DIGITAL LCD SCALE WEIGHS IN EITHER GRAMS OR OUNCES

Multi-use scale has a capacity of 70 ounces, graduated by 0.1 ounce, or 2,000 grams, graduated by one gram. Auto zero adjust when scale is turned on. Multiple tare and gross weight capability. Easy-to-clean plastic tray. Ounce/gram selector. Scale is operated by a single nine volt battery (not included) or optional AC adapter. Low battery indicator. With postage rate, calorie and carbohydrate charts. Limited 1 year manufacturer's warranty. 6-1/8" x 4-1/2".

Digital Scale **E33,066 $139.95**
AC Adapter **E37,745 $13.95**



GA SERIES ANALYTICAL BALANCE

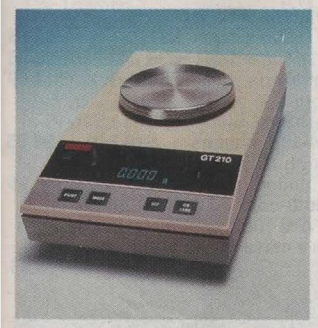
Ohaus electronic analytical balance is characterized by its extremely easy operation, its quick response time and by its high precision. Special features include a removable calibration key and a spacious weighing chamber accessible from sides and top. Simple convenient controls perform all operations. Other features are:

- **Large, easy-to-read digital display**
- **Automatic zero tracking**
- **Automatic calibration**
- **Optional RS232 data interface**
- **Selectable operating parameters**
- **Optional security device**
- **Below balance weighing capability**
- **Push button tare with audible signal**

SPECIFICATIONS:

Temperature Range	10° - 40°C, 50° - 104F°		
Capacity	110g	**Readability**	0.0001
Precision (std dev)	0.0001	**Linearity (g)**	0.0003
Pan Size	3.5" dia.	**Tare**	Full Range
Stabilization Time (sec)	~3.0 2	**Weight Units/Modes**	g
Calibration	Internal	**Weigh Below**	Yes
Power Requirements	100/120/220/240VAC; 50 - 60Hz 20W		
Weighing Chamber	15.2" x 16.5" x 23.8"		
Baud Rates	150, 600, 1200, 2400, 4800, 9600		

Analytical Balance E37,728 $2,175.00
Anti-Theft Kit E38,771 $45.00



GT SERIES PRECISION TOPLOADER

The GT Series top-loading precision balance can handle a wide range of weighing applications - from straightforward weighing up to very complex procedures. State-of-the art technology . It features:

- **Automatic zero tracking**
- **Automatic calibration**
- **Movable Ohaus FineRange™**
- **Built-in Ohaus FillGuide™**
- **Three programmable modes**
- **Optional Security Device**
- **Below balance weighing capability**
- **RS232 bi-directional interface is standard**

SPECIFICATIONS:

Capacity	800g	4000g	**Readability**	0.01g	0.1g
Precision (std dev)	0.01g	0.05g	**Linearity**	0.02g	0.1g
Pan Size	6.6" dia.		**Tare**	Full Range	
Stabilization Time	2 sec.				
Calibration	Push Button				
Weight Units/Modes	g,lb,oz,ct,dwt,taels,oz t,3 custom modes & parts counting				
Baud Rates	110, 300, 1200, 2400, 4800, 9600				
Temperature Range	10° - 40°C, 50° - 104°F				
Power Requirements	100/120/220/240VAC 50 - 60Hz 20W				
Weight Units/Modes	g,lb,oz,ct,dwt,taels,oz t,3 custom modes & parts counting				
Baud Rates	110, 300, 1200, 2400, 4800, 9600				
Temperature Range	10° - 40°C, 50° - 104°F				

Precision Toploader E38,772 $1,425.00

PRECISION STANDARD SERIES TOPLOADING BALANCES

Simple, two-button operation in a durable, easy-to-use package. Features push button auto-calibration; full capacity tare by subtraction; large easy-to-read .6" liquid crystal display; stainless steel platform; in a rugged cast aluminum case with a sealed front panel and a 30 month warranty. Operates from an external AC adapter (included) requiring 120 VAC, 50/60 Hz (100, 220 and 240 VAC versions also available). Dimensions: 8.5"W x 14"D x 3.75"H. #39,245 includes a flip-up draft shield (not pictured).

Stock No.:	E39,245	E39,246	E39,247	E39,248	E39,249
Price:	$895.00	$755.00	$945.00	$850.00	$1,095.00
Cacacity:	120g	400g	40/400g	4000g	400/4000g
Readability:	.001g	.01g	.001/.01g	.1g	.01/.1g
Platform Size (in.)	4.75Dia.	4.75Dia.	4.75Dia.	6.5Wx6D	6.5Wx6D
Precision:	.001g	.007	.001/.007	.07	.01/.07
Linearity:	.001g	.01g	.001/.01g	.1g	.01/.1g
Stabilization Time:	2.5 Sec.	2.5 Sec.	2.5 Sec.	2.5 Sec.	2.5 Sec.

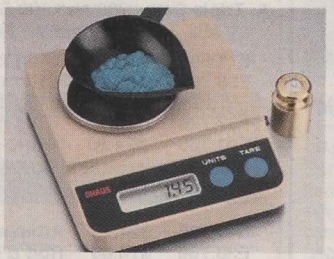
LUME-O-GRAM® AND LO PRO LUME-O-GRAM® BALANCES

Ohaus high quality and economy in a classroom weighing instrument. Portable and ruggedly built, Dependable and will provide years of reliable results.

- **Flat weighing surface and 1300ml weighing container is standard**
- **Dual range in the Lo Pro /Lume-O-Gram**
- **AC or battery operation**
- **Large, bright LED display**
- **Readable in g and lb/oz**
- **Rugged, shockproof plastic housing**
- **Full capacity tare**

SPECIFICATIONS:

	Capacity/Readability		Stock No.	& Price
Lume-O-Gram®	1000g x 2g	35 oz. x 0.1 oz.	**E34,039**	**$89.00**
	2000g x 5g	5 lb. x 0.2 oz.	**E37,727**	**$89.00**
Lo Pro Lume-O-Gram®	1000g x 2g	35 oz. x 0.1 oz.	**E36,033**	**$79.95**
Accessory AC Adapter			**E36,105**	**$16.95**



A. CT SERIES ELECTRONIC BALANCES

The versatile CT series of electronic toploaders are portable, lightweight and rugged, yet offer the readability and precision required for science labs. Economically priced, they offer many features not found in balances costing much more.

- **Auto calibration**
- **Metric or non-metric units**
- **AC or battery operation**
- **Optional security device**

Power requirements: AC adapter (Supplied with Balance), 8 "AA" Batteries (not Included).

SPECIFICATIONS:

Stock No.	E38,776	E38,777	E38,778	E38,779
Price	$545.00	$365.00	$410.00	$450.00
Capacity	200	600	1200	6000
Readability	0.01	0.1	0.1	1.0
Linearity g	+0.01	+0.1	+0.1	+1.0
Precision g	0.01	0.07	0.1	1.0
Platform Size	3" dia.	4" dia.	4" dia.	4.74" x 6.5"
Tare	Full Capacity			
Dimensions	7" x 7.6" x 2.3"			
Security Device			**E38,773**	**$25.00**
Computer Interface For CT Series Only			**E38,768**	**$95.00**

B. C305 ELECTRONIC BALANCE

The C305 provides your students with state of the art electronics at an affordable price. Offers speed and accuracy, allowing for more learning time.Portable too! Use the C305 in the classroom or out in the field.

- **300g x 0.1g**
- **Easy to read LCD display**
- **Reads in grams and ounces**
- **Automatic calibration**

SPECIFICATIONS:

Capacity 300g/10 oz **Readability** 0.1g/0.01 oz
Maximum Over Range Capacity 105%
Precision (Standard Deviation) 0.07g
Tare Full Capacity
Power Requirements AC Adapter (included)or 9V Battery (not included)
Dimensions 7"L x 7.6"W x 2.3"H

Electronic Balance E38,780 $179.00

HARVARD TRIP 1400/1500 BALANCES DIAL-O-GRAM® 2000 BALANCES

The Harvard Trip Balances have angled beams and pointers and can be used for virtually any massing application. The Dial-O-Gram has a vernier dial to speed the weighing process.

- **Magnetic damping**
- **2000g capacity**
- **Readability of 0.1g**
- **Beam and dial models available**
- **Choice of three platforms**

A. Harvard 1400 and 1500 Series Balances Capacity/Readability	Tare	Stock No.	Price
2000g x 0.1g	Single Beam/Plate	**E37,708**	**$143.00**
5 lb x 0.01oz	Single Beam/Plate	**E37,709**	**$153.00**
2000g x 0.1g	Double Beam/Pan w/Tare	**E37,710**	**$167.00**
B. Dial-O-Gram® 2000 Series Balances			
2000g x 0.1g	Dial/Plate w/Tare	**E38,781**	**$199.00**
Specific Gravity Kit -	Rod & Clamp Assembly	**E38,769**	**$14.00**

CENT-O-GRAM® 311 BALANCES

For precision lab work calling for .01g sensitivity, these two all-purpose balances fill the bill at surprisingly economical prices. Their unique pan and bow design permits easy handling of laboratory materials.

- **Self-storing specific gravity platform**
- **Magnetic damping**
- **Optional test tube support accessory**
- **Windowed poises**

SPECIFICATIONS:

A. Dial-O-Gram® 310 Balance
Capacity/ Readability 310g x 0.01g
Calibrations Front Beam 100 x 10g,
Rear Beam 200 x 100g
Dial & Vernier 10 x 0.01g
E71,970 $183.00

B. Cent-O-Gram 311 Balance
Capacity/ Readability 311g x 0.01g
Calibrations Front Beam 1 x 0.01g ,
Second Beam 10 x 1g
Third Beam 100 x 10g
Rear Beam 200 x 100g
E37,535 $132.00

C. Test Tube with counter weight/Specific Gravity Kit **E38,766 $5.95**

PRECISION MASSES AND MASS SETS

Ohaus analytical and precision masses and mass sets are an important part of your instructional program. Teach students the importance of mass standards, calibration techniques, proper handling and care of masses and sound scientific principles.

- **Brass and stainless steel**
- **Available in both grams and newtons**
- **Available in hooked and slotted versions**
- **Packaged in container for protection, safe keeping**

Analytical Mass Sets:

A. Stainless Steel/Aluminum

500mg x 1mg set	E37,713	$39.00
50g x 1mg set	E37,715	$207.00

B. Metric Mass Sets: Brass

500mg x 1mg set	E37,716	$11.00
50g x 10mg set	E36,117	$15.00
50g x 1mg set	E37,717	$22.00
50g x 10g Set	E38,770	$8.95
100g x 1mg set	E37,719	$25.00
200g x 1mg set	E37,721	$35.00
500g x 1g set	E36,115	$45.00
1000g x 1g set	E36,116	$69.95

C. Metric Hooked and Slotted Mass Sets

1000g x 10g (hooked)	E37,722	$63.00
500g x 10g (slotted)	E37,723	$49.00
500g x 10g (slotted)	E37,724	$69.00

TRIPLE BEAM 700 & 800 SERIES BALANCES
DIAL-O-GRAM® 1600 SERIES BALANCES

The classic weighing instruments for classroom instruction, these balances provide accurate results year after year. Their rugged construction means they can take the rough handling students dish out. Weigh anything - liquids, solids or live animals.

- **Optional tare beam**
- **Magnetic damping**
- **Tiered notched beams**
- **Choice of weighing platforms: scoop, and pans**
- **Equipped for specific gravity weighings**

A. Triple Beam 700 and 800 Series Balances

		Capacity/ Readability	
E71,695	$93.00	610g x 0.1g	SS Plate
E38,767	$109.00	2610g x 0.1g	SS Pan
E37,725	$135.00	610g x 0.1g	SS Scoop
E37,726	$139.00	610g x 0.1g	Animal Container
E41,766	$24.95	Metric All Weight Set	

B. Dial-O-Gram® 1600 Series Balances

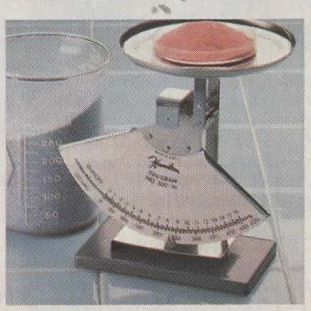
E72,466	$148.00	610g x 0.1g(225g)	SS Pan, Tare
E41,766	$24.95	Attachment Weights	
E38,769	$14.00	Rod & Clamp Assembly for Specific Gravity Weight Support	

HEAVY DUTY BALANCE BEAM SCALES IN EITHER OUNCE OR KILOGRAM READINGS

All metal scales have 9/16" deep chrome tray. Ideal for weighing bulk chemicals and large items. Rust-resistant for industrial or lab use. Available in either ounce/pound or gram/kilogram readings.

SPECIFICATIONS:

	Ounce/Pound	Gram/Kilogram
Capacity	22 pounds	10 kilograms
Calibration	1/16 ounce	1 gram
Size Overall	12" x 4" x 7"	12" x 4" x 7"
Tray	9/16" deep 12-5/16"long 7" wide	9/16" deep 12-5/16"long 7" wide
Item	E36,035	E36,036
Price	$109.00	$109.00

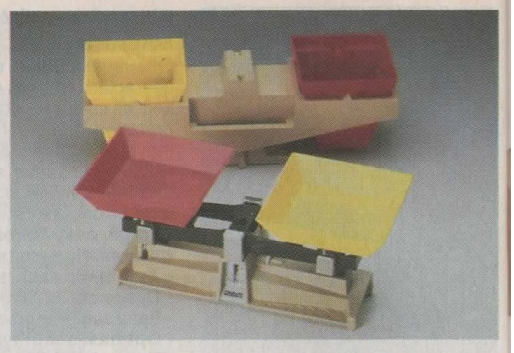


GRAM & OUNCE SCALE

Quality scale at an affordable price. The tray is 4" in diameter and has a raised edge. Scale stands 6" high. Has weighted 4-1/4" x 2-1/2" felt-lined base.

Ounce Capacity:	0-16 ounces
Calibration:	1/2 ounce
Grams Capacity:	0-500 grams
Calibration:	10 grams

Scale **E90,053 $20.95**



SCHOOL/PRIMER® BALANCES

Great tools for introducing younger students to the science of metrology. These balances are economical yet accurate, simple yet fun to use. Both are strong, lightweight and virtually maintenance free, performing through years of rough handling.

- **Rugged construction**
- **Zero adjust mechanism**
- **Removable buckets/pans**
- **Manual damping on the School Balance**

SPECIFICATIONS:	Capacity/ Readability		
School Balance	2000g x 0.5g	(Without Mass Set) E71,168	$55.00
Primer® Balance	2000g x 1g	E37,707	$17.95

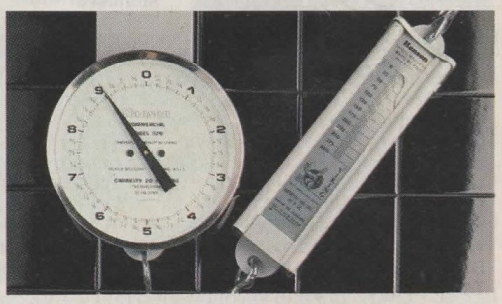
School/Primer Metric Weight Sets

	50g x 1g	E37,757	$6.95
	50g x 10g	E38,770	$8.95
Rod & Clamp Assembly		E38,769	$14.00

A. 52 Color Coded Round Stacking Mass Set, 40-1g,8-5g, and4-10g masses E38,879 $8.95

B. 35 Square Stacking Mass Set, 20-5g,10-10g, and 5-20g color coded masses E38,880 $8.95

C. 100 Precision Multi-colored Cubes, single cube has a volume of one cubic centimeter, displaces a milliliter, and has a mass of one gram. E38,881 $5.95



HANSON INDUSTRIAL HANGING SCALES

Durable enamel finished steel cases. Protective recessed dials. With top and bottom hooks.

300 Pound Capacity. Marked in five pound increments. 3-1/4" x 2-1/8" x 19"
E36,039 $57.95

200 Pound Capacity. Marked in one pound increments. Straight spring-balance in telescoping case. 3-1/4" x 2-1/8" x 19"
E36,040 $44.95

100 Pound Capacity. Marked in one pound increments. Straight spring-balance in telescoping case. 3-1/4" x 2-1/8" x 19"
E36,041 $44.95

50 Pound Capacity. Marked in one pound increments. 1-7/8" x 1-3/4" x 11-1/4"
E36,042 $37.95

90 Kilo Capacity. Marked in one kilo increments. 3-1/4" x 2-1/8" x 19" **E36,038 $57.95**

HANSON COMMERCIAL HANGING SCALES

Rugged steel construction with baked enamel finish, glass enclosed dial, chrome bezel. Individually serialized. 8-1/4" diameter face. 12" long. Two revolutions indicates capacity.

60 Pound Capacity. Graduated to tenths of a pound
E36,045 $79.95

20 Pound Capacity. Graduated to one ounce with larger quarter-pound and pound markings
E36,044 $69.95

Scoop. Galvanized steel scoop is supported by 3 metal chains and hanging hook. Rolled edges for safety. 17" x 11-5/8" x 5-7/16" **E36,043 $24.95**

BLOCK OUT UNWANTED NOISE

Improve your environment for study, sleep, reading and concentration with our economical "white sound" conditioners. Two models to choose from. Ideal for light and problem sleepers.

A) Standard Model: Produces a steady flow of "breeze-like" sounds. 3-1/2" H x 6-5/8" Dia. Weighs 1.6 lbs. UL listed. Color: pebble. **E71,980 $42.95**

B) The "Traveler" fits easily in a briefcase. Offers a wide range of environmental sounds within rain and waterfall settings. Travel case included. 5-1/4" x 4-1/8" ; 2-1/4" H. Weighs 1.2 lbs.

The Traveler **E38,783 $89.95**

FINGER BLOOD PRESSURE & PULSE MONTOR

Compact, portable unit features adjustable finger cuff to accurately detect blood pressure and pulse. Simply place left index finger inside finger cuff and tighten. Adjustable cuff ensures a comfortable fit . Blood pressure and pulse are quickly detected by oscillometric method. Cuff then automatically deflates. Unit shuts off within 1-1/2 minutes. An error indicator signals improper procedure. Digital readout alternately displays blood pressure and pulse. Instructions and 4" AAA" batteries included.

Monitor **E38,379 $149.00**

BIG HEAT...PORTABLE 120V HEATER/BLOWER

Compact 4-3/4" Wx5" Hx6" D heater produces 1500 watts of fan-forced heat. Energy-saving 1200W setting and doubles as a fan for summer cooling. Built-in handle, thermostat control, long-life, coil-type heating element, chrome grille, steel case, woodgrain vinyl finish. Tip-over switch and overheat protector. 120V, 60Hz outlets. 6 foot cord, wt. 4 lbs.

E31,710 **$54.95**

TWEEZERS FOR FINE WORK

Medical tweezers are a superior precision pair of surgical quality tweezers, handcrafted of 100% stainless steel. Ideal for splinters, ingrown hairs; will tweeze the finest hair. 4-3/8" x 5/16". Opens to 3/8" .

Medical Tweezers **E31,345 $9.75**

BIOFEEDBACK MONITOR

GSR/Temp 2 Biofeedback Relaxation System

- **Measures Skin Resistance And Skin Temperature**
- **Helps You Monitor Stress & Strain**

This galvanic skin response and temperature monitor uses solid-state electronics to detect and amplify internal body activities that change with your state of mind, muscle tension and emotional level. System includes thermistor thermometer for starting temperature, elastic strap to keep hand in constant contact with unit. 30 minute cassette, earphone, battery, instruction manual and high impact case. Unit described shown at right.

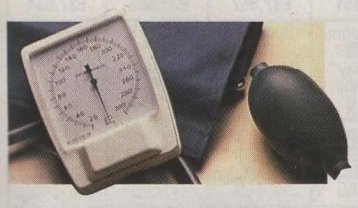
(Unit pictured at left is no longer available.)

GSR/Temp 2 System **E42,637 $135.00**

SOUND CONDITIONER CREATES A CONTEMPLATIVE ENVIRONMENT

This deluxe sound unit produces a sound, or a variety of sounds that blend with the total sound present and has the ability to mask many disturbing sounds. Ideal for day sleepers, homes, offices, near highways or airports, sleeping with chronic snorers and more. 4 sound selections: **Surf 1:** single wave pattern; **Surf 2:** random, loud and soft waves; **Rain:** steady, gentle downpour on a tin roof; **Waterfall:** deep roar depicting volumes of falling water. 3 voice tone and volume controls. Colonial white, with black grille. 110-120VAC, 50-60Hz, 5 watts or less. Cord 7.5 feet. 5" speaker. .8 ohm's, 2.6 lbs. 3.5 mm speaker jack.

Sound Conditioner **E72,293 $149.00**



BASIC ECONOMY BLOOD PRESSURE KIT

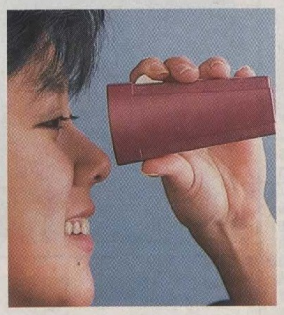
Proven traditional instrument that does not require batteries. Includes dial gauge sphygmomanometer with D-ring quick release velcro® cuff (calibrated to 30 mm Hg/No Stop Pin) plus Bowles Stethoscope, instructions, vinyl case.

E37,492 ***$29.95*** **On Sale $27.95**

WHAT PERCENT OF YOU IS FAT?

Helps you determine the percent of lean body mass you should have to be the correct percent fat. 8" long meter is a skinfold caliper. To take a reading just apply the meter to various parts of your body.

E33,033 $17.95



SEE THE INSIDE OF YOUR EYE

Eyescope is an optical device for looking at the inside of your eye. It is a means of self-evaluation and an educational tool. Eyescope is a specially designed diffuser incorporating a parabolic mirror and lens light. Safe and easy to use. Designed like a pocket flashlight. 4" x 2". Uses two "AA" batteries (included). Also includes detailed 52 page booklet describing the eyescope and the various features inside the normal eye; how the iris works, kinds of floaters and fixed objects, how to inspect contacts, etc.

Eyescope E33,538 $28.95

BUDGET PRICED OTOSCOPE SET

- **Rotary Light Control**
- **Powerful Magnification Lens**

This set includes an otoscope fairlight with three aural speculae, a nasal speculum and a plastic battery handle and case. 6-3/4" in length and 1-1/2" in diameter. Uses two "C" batteries (not included). Also can be used to inspect hard-to-reach-or-see areas for monitoring purposes.

Budget Otoscope **E31,252 $59.95**

PROFESSIONAL OTOSCOPE

- **Fingertip Light Intensity Control**
- **Powerful Magnification Lens**

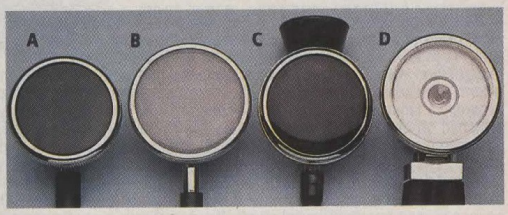
Set includes three standard-sized speculae, duckbill speculum and illuminated Number 3 and 4 mirrors. Positive locking system. Chrome plated parts. Set fits into padded storage case which measures 10-3/4" x 2-1/2" x 5-1/2" . Uses two "C" batteries (not included). Used in the medical profession to inspect ears, nose and throat. Can be used as an inspection monitor.

Professional Otoscope Set **E72,531 $199.95**

"IONIC" WATER FILTER SYSTEM IN A STRAW

Unique water filter in a drinking straw configuration from your normal drinking water (municipally treated water) for up to one year. Non-toxic filtering media consists of carbon and a patented high purity metal alloy consisting of two dissimilar metals that once wet, create an electrostatic charge that attracts contaminants and electroplates them onto the media. Removes chlorine, lead, mercury, hydrogen sulfide, aluminum, arsenic, cadmium, chronium, barium, plus algae, fungus, scale and sediment.

Filter Straw **E39,139 $9.95**



A) BOWLES STETHOSCOPE. Economically priced for nurses, expectant mothers, classroom science activities. Excellent quality sound reception. Lightweight, single-head. Plastic head reduces chill. Black plastic tubing. Ear tips fit comfortably. **E37,451 $9.50 Two or More, $8.75 Each**

B) DUAL HEAD STETHOSCOPE. Thin, streamlined binaurals. Ear tips fit comfortably. Dual head reverses to serve as either a Bowles or Ford type stethoscope. Chest piece is non-chill. Diaphragms and tubing specifically engineered to provide maximum sound pick-up and sound transmission. Weighs 3-1/2 ounces. Gray color. **E37,453 $13.95**

C) BELL/DIAPHRAGM. Binaural frame with ear tips, black rubber tube with yoke and extra extension. All metal parts are chrome plated. One pair of extra ear plugs included. Changeable chest piece converts to either bell or diaphragm configuration. Instructions. **E35,876 $22.95**

D) SPRAGUE-RAPPAPORT-TYPE STETHOSCOPE. Features five head selections (two diaphragms and three bells) that permit the localization of high, medium and low-pitched sounds. Lightweight, non-chill plastic heads. Chestpiece interchangeability permits finest acoustical response. Storage pouch. 23-1/2" long. **E31,137 $29.95**

HANNA LABORATORY INSTRUMENTS

A) A Pocket pH Indicator for about the Price of an Electrode
This compact device does the work of 100 rolls of pH paper, yet features an easy-to-read LCD and an accuracy of 0.2pH—far superior to litmus paper. Ready-to-use. Just remove the protective cap, insert bottom of device to measure, and check the reading. Has offset calibration adjustment for standardization with one pH buffer. Sealed combination electrode is designed for general-purpose use. PVDF junction resists fouling, assuring longer life in most applications. Electrode is not replaceable. Batteries included. (Eveready EP675E-6).

Range: 0 to 14.0 pH	Resolution: 0.1 pH
Accuracy: 0.2 pH	Display: ¼" LCD
Ambient: 0° to 50°C, 32° to 122°F	Power: four, 1.4V mercury batteries (included); up to 1000 hours continuous use (EP675E-6)
Dimensions L × W × H: 5.6" × 1" × 0.6"	Wt.: 2 oz.
Pocket pH Meter	**E37,556 $39.95**

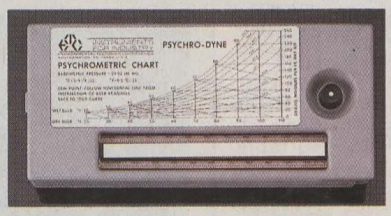
B) Pocket pH and Temperature Meters in one Compact Wand
Get temperature and pH reading in this one convenient unit. Provides accuracy to within .4 degrees C in less than two minutes and pH readings to within .01pH. The unit comes with a splash-proof membrane keyboard, automatic temperature compensation and display indications for pH, degree C and low battery. Includes epoxy electrode, carry case and batteries.

Ranges: 0 to 14 pH; 0 to +70°C	Resolution: 0.01 pH; 0.1°C
Accuracy: 0.01 pH; 0.4°C	Input resistance: 10^{12} ohm
Display: ½" LCD	Calibration: slope adjustment 1 pH
Slope range: 85 to 105%	Temperature compensation: automatic from 0 to +70°C
Type of electrode: HI 1213 screw-type epoxy-body combined pH electrode with temperature sensor (included); length 6", diameter .5"	Power: one 9V battery (included); life 100 hours of continuous use
Size: L × W × H (body) 7.2" × 6.1" × 1"	Weight: only 5.3 oz.; complete with electrode and soft vinyl carrying case (included) 11.6 oz.
pH Wand	**E37,557 $239.00**
Replacement Electrode	**E37,559 $62.95**
1 Meter Extension Cable	**E37,560 $29.95**

Optional All-Polymer Submersible Probe. For difficult to reach measurements in drums or tanks. 28"L × 1.25"O.D., pH probe is held by a PVC gland with water-proof Viton® O-ring. **E37,561 $96.00**

C) Bench Meter Performance in a Portable pH & Temperature Meter
Most users of pH meters already know about the benefits of microprocessors such as buffers stored in memory, automatic calibration, automatic buffer recognition, automatic temperature compensation, and no potentiometers/trimmers necessary. Many portable instruments with these specifications experience failure due to high power consumption. They lose memory when switched off or they need continuous battery recharges. The microprocessor has overcome all these problems and even has an enhanced meter to provide for pH, mV, ORP, ISE and temperature readings. This unit has all the advanced features you'd expect to find in a bench-model instrument with autoranging in the mV mode ISE to ORP when reading reaches ±399.9 and no loss of memory when switched off. It automatically prompts you with NBS and technical buffer values. Calibration data is stored when unit is shut off. It has sufficient resolution to permit use with most ion selective electrodes.

Ranges: 0 to 14 pH; 0 to +399.9 mV (ISE); 0 to ±1999 mV (ORP); 0 to +100°C.; 32 to 212°F.	Resolution: 0.01 pH; 0.1 mV; 0.1°C.; 0.1°F.
Accuracy: 0.01 pH; 0.2 mV, 0.4°C.; 1°F.	Input resistance: 10^{12} ohm
Display: ½" LCD	Calibration: slope adjustment 1 pH
Slope range: 85 to 105%	Temperature compensation: automatic or manual from 0 to +100°C.; 32 to 212°F.
Type of electrode furnished	Screw-type epoxy-body combined pH electrode (included); length 6", diameter 0.5". Epoxy-body and stainless steel temperature probe (included); length 6", diameter ⅜", with one meter cable
Power: one 9V battery (included); life 40 hours of continuous use	Size L × W × H: Instrument only 7" × 3.2" × 1.8"
Weight: only 10.6 oz.; complete with electrode and temperature probe. 1.25 lbs.	
pH/Temp. Meter	**E37,558 $299.00**
Replacement pH Electrode	**E37,562 $40.00**
Replacement Temperature Probe	**E37,563 $35.00**

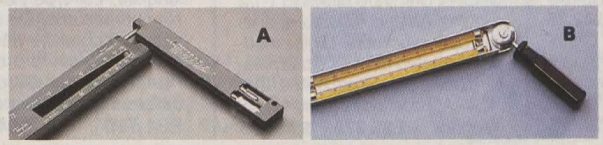


PORTABLE BATTERY POWERED PSYCHROMETERS

- **Greater than 1% Accuracy for RH Determination**
- **Greater than ¼% Accuracy on Thermometers**
- **Steady Aspiration Allows Readings in 1½ to 2 Minutes**
- **Customized, High-Density Polyethylene Carrying Case, Spare Wick and Spare Lamp Included**

This completely portable instrument indicates wet and dry bulb temperatures for relative humidity and dew point determinations. Designed and manufactured to rigid Weather Bureau and Navy specifications. Instrument weighs less than 3 lbs., including carrying case. Air movement over thermometers is provided by means of a miniature fan powered by a 4-pole permanent magnet motor. After noting wet and dry bulb readings, humidity can be determined by a chart on the instrument, a slide rule, or standard psychometric tables provided in the instruction manual. Vapor pressure can also be computed using the wet and dry bulb method. Housed in the 10" × 4½" × 2" case are a pair of thermometers, a permanent magnet fan motor, 2 oz. water bottle, thermometer illuminating lamp, and on/off switch and intensity control. Also includes instruction manual, humidity-calculator slide rule and spare parts kit (extra wicking material and lamp). Instrument may be wall mounted.

Fahrenheit (°F-Mercury) Model: Range 0 to 120°F, 1° graduations, accuracy ±3°. **E36,881 $150.00**
Replacement Thermometers for °F model. **E36,884 $36.00**
Centigrade (°C-Mercury) Model: Range −15 to +45°C, ½° graduations, accuracy ±0.2°. **E36,882 $150.00**
Replacement Thermometers for °C model **E36,885 $36.00**
Spare Parts Kit. 12 inches of wicking and one lamp. **E36,887 $11.00**



SLING PSYCHROMETERS

A) Sling Psychrometer. Weather bureau-type wet and dry bulb thermometers range 20°F to 120°F, mercury-filled tubes. Self-contained case. Slide rule design. ⅝" × 1⅝" × 6⅞". **E36,154 $54.95**

B) Sling Psychrometer. Measures humidity; excellent for lab use. Contains two mated 9" thermometers. 10° to 110°F. ½" divisions, mercury filled; in aluminum frame with "sling" handle. Bulbs partitioned. 10¾" × 1⅜". Includes Weather Bureau Psychrometric Tables. **E71,477 $49.95**

PRECISION RECORDING INSTRUMENTS

- **Measure Temperature Variations From 0° to 100°F**
- **All Metal Construction**
- **Include Recording Charts and Pen**

Self-contained, battery powered precision instruments are very portable and provide accurate hard-copy 7 day/24 hour records. All metal construction.

A) Temperature Recorder (pictured) measures and records temperature variations from 0° to 100°F over a 7 day period on a four-inch diameter chart. Accurate to ±2% of full scale. Quartz movement runs on 1.5V "AA" battery. Measures 6"L × 6"W × 2"Th., includes 100 charts and cartridge pen.
Temperature Recorder E35,350 $280.00

B) Temperature and Humidity Recorder measures and records temperature variations from 0° to 100°F and humidity variations from 0% to 100% Ph over a 7 day period on a four-inch circular chart. Accurate to ±2% temperature, ±3% humidity. Quartz movement runs on 1.5V "AA" battery. Measures 6¼L" × 6¼"W × 4"Th., incl [illegible] and cartridge pens (unit is not pictured).
Temperature/Humidity Recorder E35,022 $585.00
Extra Charts for Both E35,150 $19.95

DIGITAL pH METER FITS IN YOUR POCKET

The pH pen is totally self-contained. Easy to use, with a single calibration adjustment. Features a display hold button, a combination pH electrode and a large, easy-to-read LCD readout. Includes 4 button batteries that provide 100 hours of use, two buffer capsules, pocket clip and instructions. Snap-on cap automatically turns meter off.

SPECIFICATIONS:
Operating Range: 2-12 pH; **Resolution:** 0.1 pH; **Operating Temp. Range:** 5-40°C **Weight:** 4 oz.; **Measures:** 1"W × ⅝"D × 5½"H.
APPLICATIONS:
Home: Swimming pools, aquariums, hot tubs and green houses.
Industry: Unlimited. Quality control for food processing, cooling, tower inspections, water treatment, printing, chemicals, plating, aquaculture, and in education demo.

pH Pen **E35,558 $89.95**

DIGITAL pH METER—HAND HELD. Battery-powered meter delivers precise readings with 0.1 resolution over full 0-14 pH range. Characteristic reproducibility of 0.05 pH. Red 5/16" LED display. 3½" × 5" × 2", weighs 11 ounces. Digital meter probe. 4.01 and 6.86 buffers, case. Not pictured.
Hand Held pH Meter **E61,300 $310.00**
Replacement Electrode **E42,026 $64.95**

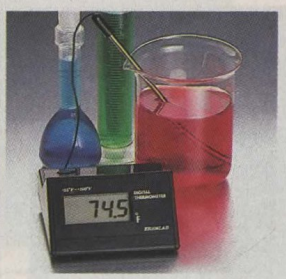
LOW PRICE POCKET-SIZED DISSOLVED SOLIDS TESTER

The DiST monitors solids-built-up and spots problems quickly while they're still manageable. High concentrations of total dissolved solids (TDS) can result in costly corrosion and scale deposits in industrial/commercial equipment and extensive damage in agriculture and horticulture. Quick and reliable, the DiST 1 and 3 are excellent for monitoring water in fish farms, pollution control, aquariums, fertilization, and water treatment. The DiST 2 and 4 units are better for cooling towers, boilers and steam heating systems, swimming pools, whirlpools, saunas and water purification plants. With automatic temperature control.

SPECIFICATIONS

	DiST 1	DiST 2	DiST 3	DiST 4
Stock No.	E37,551	E37,552	E37,553	E37,554
Range	1990 ppm TDS Display Reading ×10	10000 ppm TDS Display Reading ×100	1990 µS Display Reading ×10	19900 µS Display Reading ×100
Resolution	(1) 10 ppm	(1) 100 ppm	(1) 10 µS	(1) 100 µS
Accuracy	2% FS	2% FS	2% FS	2% FS
Display	¼" LCD	¼" LCD	¼" LCD	¼" LCD
Operating temperature	from 0 to 50°C, 32 to 122°F.			
Battery life	200 operational hours (approx.)			
Dimension (L × W × H)	5.5" × 1.2" × 0.6"			
Weight	1.75 oz. (approx.)			

Dissolved Solids Tester **$44.95 Each**
Replacement Batteries. Pkg. 12 Eveready EP675E-6 **E37,555 $10.95**



ES ECONOMICAL DUAL FUNCTION DIGITAL LAB THERMOMETER

Our battery-powered digital electronic thermometer measures both environment and probe temperature. Ideal for laboratory test where both factors must be noted. Our instrument utilizes specially designed sensors and circuitry similar to those found in very expensive models. Ideal for temperature measurement of air, liquids, soft-state materials and solid-state surfaces. Features large ½" LCD display, 5½" metal probe with 28" wire lead, selector switch (probe/environment), and low battery warning. Requires one 9V battery (not included).

Digital Thermometer **E36,987 $42.95**

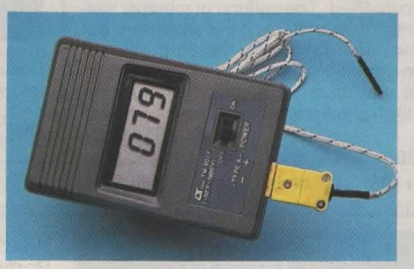
SPECIFICATIONS:
Measuring Range: −55°F to +199°F
Measuring Accuracy: 0°F to 140°F: ±1.8°F.
Resolution of Reading: ±0.2°F −55°F to +199°F decreasing linearly to ±3.6°F.
Battery: 9V battery. Length of operation more than half of year. When battery becomes weak the (LOBAT) symbol will appear on the digital screen. Replace battery immediately.
Unit Measurements: 1¾"H × 3½"L × 3½"W.
Probe Measurements: 6¼" overall—5½" probe surface exposed metal.
Weight: 6 oz. approximately.
Response Time: Liquid (32°F-199°F)—30 sec. saturated. Air—3 to 5 min. saturated.

HIGH-LOW ALARM LABORATORY THERMOMETER

- **Presetable High/Low Alarm**
- **Switchable Probe/Room/Clock**

Enter high and low temperatures you select and unit will warn you when either is reached. Switch allows you to monitor either probe or base unit reading. Built-in clock displays hour and minutes at push of button. Features stainless steel probe with one meter cord. **E37,376 $34.95**

SPECIFICATIONS:
Measuring Range:
Base Unit: 14°F to 140°F
Probe: 0°F to 160°F
Resolution of Reading: ±0.1°F
Measuring Accuracy: ±2°F (32°F to 104°F at 1.5V)
Unit Measures: 4"L × 2¼"W × ¾"T
Probe Measures: 7½" overall, 4" exposed metal
Power Requirements: 1 "AAA" Battery.



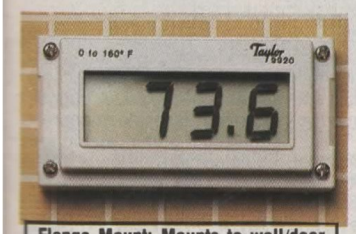
HIGH TEMPERATURE PORTABLE DIGITAL LAB THERMOMETERS

- **−50°F to 1400°F/−50°C to 750°C**
- **Accepts All K-Type Probes**

Laboratory instrument provides temperature readings over a broad range. Calculator-size lightweight case measures 4¼"L × 2⅞"W × 1"T and features On/Off switch, ½" LCD display, open circuit and low battery alarms. Powered by one 9 Volt battery (not included-150 to 200 hour life). Comes with 2 K-Type mini-plug thermocouples, each 47" long. Accepts all K-Type (NiCr-NiAl) probes. Weighs 5 ozs.

SPECIFICATIONS:
Max. Temp.: Naked Bead Probe: 250°C/482°F;
Stainless Steel Probe: 750°C/1382°F.
Resolution: 1°C/1°F.
Centigrade Accuracy: −20 to −40°C: typ. ±3°C; 0 to −20°C: typ. 0±2°C; 500 to 750°C; ±(0.75% + 1°C); 500 to 750°C: ±(1% + 1°C).
Fahrenheit Accuracy: −20 to −40°F: typ. ±4°F; 0 to −20°F: typ. ±3°F; 0 to 750°F; ±(0.75% + 1°F); 750 to 1400°F: ±(1% + 1°F).
Power: DC 9V battery, 14mV consumption, approx. 150-200 hour life.

Thermometer & 2 Probes F°	**E37,377 $135.00**
Thermometer & 2 Probes C°	**E37,378 $135.00**



PANEL MOUNT DIGITAL THERMOMETERS

Thermometer allows fast, accurate readings without exposure or loss of climate control. Ideal for freezers, refrigerators, greenhouses, warming chambers, etc.

SPECIFICATIONS:
Panel Dimensions: 2⅝"W × 1⅜"H × 1⅛"D
Panel Material: White polystyrene
Display: ½"LCD, ⅒° resolution
Power: 1.5V battery ("AA") not included
Sensor Cable: 39"
Sensor Diameter: 3/32"
Accuracy: #37,394 & #37,396: ±2°F from −4 to 77°F; #37,395 & #37,397: ±2°F from 32° to 104°F
Maximum tolerance: ±4°F
Update Interval: 10 seconds.

Flange Mount: Mounts to wall/door surface.		
−40 to + 120°F	**E37,394**	**$22.95**
0 to +160°F	**E37,395**	**$22.95**
Flush Mount: Cut into wall/door to mount.		
−40 to + 120°F	**E37,396**	**$18.95**
0 to +160°F	**E37,397**	**$18.95**

DIGITAL THERMOMETER/HYGROMETER

Our battery powered digital electronic meter measures both temperature or humidity. Ideal for monitoring controlled environments. Laboratory-quality instrument features large ½" LCD display, 1 1/16" metal temperature probe with 48" temperature wire, selector switch (Temp/Humid.) and low battery warning. Requires one 9 volt battery (not included). For indoor use.

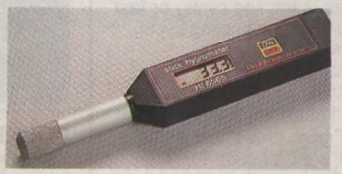
Thermometer/Hygrometer **E37,352** ~~**$79.95**~~ **Special Price $62.95**

SPECIFICATIONS:

Thermometer:
Measuring Range: −55°F to +199°F
Resolution of Reading: ±0.2°F
Measuring Accuracy: 0°F to 140°F; ±1.8°F. −55°F to +199°F decreasing linearly to ±3.6°F.

Hygrometer:
Response Time: 3-5 minutes saturated
Relative Humidity Range: 8-90%
Accuracy: 8-90%; ±2 to 3% 0-100%: decreasing linearly to 5%

Both: Power Consumption: 9V battery for approx. 3 months. **Unit Measurements:** 1¾"H × 3½"L × 3½"W. **Probe Measurements:** 2" overall—1 1/16" probe surface exposed metal. **Probe Wire Length:** 4 ft. **Weight:** 3.8 oz. approximately.



CONVENIENCE AND ACCURACY MAKE THIS HYGROMETER IDEAL FOR HUMIDITY CHECKS

A compact, easy-to-carry, economical hygrometer that lets you monitor relative humidity almost anywhere. The thin-film capacitance sensor assures accurate humidity measurement from 10 to 95% RH. Membrane keypad protects keyboard from dust or accidental splashes. Designed for one-hand operation, the sensor can be used with or without a scintered metal cap which force fits over an o-ring seal. Use the cap in dusty atmospheres, or for inserting into grain bins, etc. With the cap removed, the probe can be inserted directly into the calibration chambers of the optional calibration kit, the o-ring acting as a liquid seal.

Range: 10.0% to 95.0% RH	**Resolution:** 0.1% RH
Accuracy: ±2%, ±1 digit	**Temperature limits for RH reading:**
Probe: thin-film capacitance	32° to 114.F (0° to 60°C)
Power: 9V Battery (included), low battery indicator	**Display:** ½" LCD
Response time: 6 seconds for 95% Rh accuracy	**Battery life:** 100 hours
Shipping weight: 1.3 lbs. Complete with vinyl carrying case	**Dimensions:** instrument body: L × W × H (body) 7.2" × 1.8" × 1"; probe: 0.8" diameter × 3.5"L

Humidity Wand. With cap, battery, soft vinyl case.	**E37,546 $259.95**
Calibration Kit. 2 standard saturated salt solutions.	**E37,547 $59.00**
9V Replacement Batteries. Package of 4.	**E37,548 $9.95**

RELATIVE HUMIDITY AND TEMPERATURE...WITHIN SECONDS

This unique hand-held meter features a thin-film capacitance membrane that responds within 6 seconds to 95% of RH. It is accurate to ±2% with resolution to 0.1 RH—better than more expensive meters. In addition, you can read temperature in degrees F or C to an accuracy of ±1°F or ±0.4°C with response to 95% of ambient temperature within 15 seconds. The solid state design features a membrane keypad that's splashproof to protect switches. Its compact size and probe with flexible coiled cable lets you measure in hard to reach places. It's ideal for clean rooms, semi-conductor/electronic assembly plants, paper and textile industries, green houses, HVAC applications and drying rooms. Optional calibration kit.

Ranges: 10.0% to 95.0%; Rh 0 to +60°C; 32 to 140°F	**Resolution:** 0.1% RH; 0.1°C; 1.0°F
Accuracy: ±2% R.H.; 0.4°C; 1°F	**Response time:** 6 seconds for 95% RH accuracy, 15 seconds for 95% °C/°F accuracy with air movement
Display: ½" LCD	**Calibration:** 3 trimmers placed on the electrode tube permit calibration of low and high humidity and also the temperature.
Type of electrode: HI 70601 made of a robust ABS tube (included) containing a thin-film capacitance humidity sensor, a temperature sensor and an amplifier; length 6.6", diameter 1", with 1 meter spiral cable (included) hard wired to meter.	**Power:** One 9V battery (included); low battery indicator; 100 hours of continuous use
Size: L × W × H (body) 7" × 3.2" × 1.8"	**Weight:** instrument and electrode 11 oz. complete with soft vinyl carrying case (included) 1 lb. 2 oz.

Thermohygrometer. Membrane keyboard, complete with probe, soft vinyl carrying case, and battery.	**E37,549 $315.00**
Calibration Kit. 2 standard saturated salt solutions.	**E37,550 $59.00**
9V Replacement Batteries. Package of 4.	**E37,548 $9.95**

COMPACT DIGITAL THERMOMETER/CLOCK

Compact electronic unit measures 2½"L × 2"W × ¾"T and features large ½" digit display. Temperature is displayed constantly, range 0° to 160°F, to ⅒°F. May be switched to Celsius. Clock reads hours and minutes at push of the button. Powered by one 1.5V G-13 camera/watch battery. With easel for table mount or self-stick bracket for wall-mount. May be removed from bracket to fit in pocket.

Thermometer/Clock **E36,677 $18.95**

DIGITAL LONG PROBE LAB THERMOMETERS

• C° and F° Versions Available

Our long stem 5.5" probe laboratory thermometers allow you to measure temperature accurately in difficult to reach places. Select between normal sensing (10 sec. sampling cycle) and fast sensing (1 sec. sampling cycle). Comes with protective stem cover and instructions. Powered by one G-13 (1.5V) battery, included. Probe is 5.5"L x 0.15" Dia., unit overall is 8.75"L.

SPECIFICATIONS:

	F°	C°
Range	+14° to +230°	10° to +110°
Resolution	0.1°F	0.1°C
Stock Number	E39,214	E39,215
Price	$28.50	$28.50

DIGITAL POCKET STEM THERMOMETER

• +14°F to +223°F

Our compact digital stem thermometer is barely bigger than a fountain pen. Hinged protective cover hides the probe stem while carrying and becomes a handle extension in use. Select between normal sensing (15 sec. sampling cycle) or fast sensing speed (1 sec. sampling cycle).

Specifications:

Range: +14°F to +223°F
Resolution: 0.1°F
Power: 1 PC G-12 Size 1.5V Battery Included
Dimensions: Probe: 1-3/8" L x 1/8" Dia. Folded: 5-1/2" L x 3/4" W x 3/8" T

Thermometer E38,784 $24.95

MINOLTA/LAND COMPACT PORTABLE INFRARED THERMOMETER

• Accurate Temperatures -50 to 500°C or -50 to 950°F

Cyclops COMPAC 3 lets you measure temperatures at a distance from a target with great accuracy. All you need to do is look at an object through the instru ment and position a sighting graticule to define the spot on the object which you wish to measure. Press the "measure" button and the temperature appears on a liquid crystal display (LCD) on the instrument's rear panel. The further you are from the object, the bigger the measurement spot will be but, as long as the target fills the sighting graticule, the temperature displayed will be accurate. Distance does not affect the measurement. Cyclops COMPAC 3 focuses and detects energy radiated from an object. Microprocessor-based electronic circuits are used to produce, from the detected energy, both a digital display and a serial digital output of the temperature of the object's surface. The thermometer is battery powered and fully portable, with a battery life of over six hours in normal use (equivalent to some 10,000 two-second readings). Emissivity adjustment is by pushbutton control in 0.01 steps between 0.01 and 1.00 with the selected value displayed alongside the measured temperature. This is the only setting to be made before taking measurements—no zero setting or other adjustments are required.

COMPAC 3 Unit & Carry Case E37,601 $925.00
Optional Portable Data Printer E37,602 $750.00

SPECIFICATIONS:

Instrument Type: Cyclops COMPAC 3
Temperature Range: 50 to 500°C (-50 to 950°F)
Indication: 3-digit LCD display on back panel in 1° or 0.1° steps
Measuring Modes: Continuous measure; Peak measure; Monitor
Response Time: 0.5 seconds
OperatingTemperature Range: 0 to 50°C (32 to 122°F)
Uncertainty: ±(1% K + digit) In ambient temperature 20°C to 30°C (68 - 86°F) effective emissivity more than 0.99 and target at 2m greater than 48mm
Optical System: 8° field of view with 1°and 1.7° measuring circles
Target Diameter: 35mm at 2mm (1.38 in. at 6.56 ft.)
Detector: Pyroelectric cell **Spectal Response:** 8 to 14µm
Emissivity Adjustment:0.01 to 1.00 with 0.01 step graduations
Repeatability: ±(0.1%K) + 1 digit)
Power Source: 6 AA batteries, consumption 25mA (approximate)
Digital Output: ASCII code, RS232C, 9600 bps
Dimensions: 90H x 82W x 126mm L (3.5x3.2x5in.)
Weight: 720g (1.59lb) including batteries

TEMPERATURE SENSITIVE LIQUID CRYSTAL SHEETS FOR LABORATORY OR SCHOOL PROJECTS

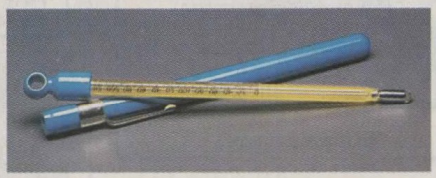
12" x 12" liquid crystal mylar sheets (.008" thick) can be cut to size with scissors. 3 to 5 micron sized crystals dispersed within a polymer matrix exhibit total color spectrum with temperature change. Provide visual testing and evaluation. Fast response time—excellent for low resolution thermal mapping.

E72,375	**(68-77°F)**	**$16.75**
E72,374	**(77-86°F)**	**$16.75**
E72,373	**(86-95°F)**	**$16.75**
E72,372	**(95-96.8°F)**	**$16.75**
E72,371	**(95-104°F)**	**$16.75**
E72,370	**(104-113°F)**	**$16.75**

LIQUID CRYSTAL SHEET ASSORTMENT

Assortment includes six 6" x 12" liquid crystal sheets, one in each of the temperature ranges listed above. Handy for research laboratories and industry. Each allows for a broad range of testing applications. Only minimal experimentation is required to conduct tests and be able to interpret the results.

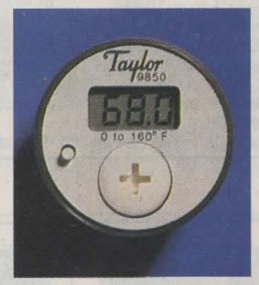
Liquid Crystal Sheet Assortment E61,161 $48.50



POCKET CASE LAB THERMOMETERS

Calibrated for total immersion. Constructed of round tubing. Mercury-filled. The column of mercury will not recede into the chamber and therefore must be shaken down for each new reading. When temperature readings cannot be continuously observed, a maximum registering thermometer will indicate the highest temperature reached during time of use. **$11.95 Each**

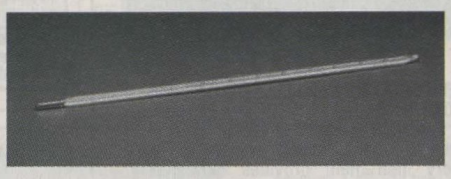
F: 0° to 220°	**(2° divisions)**	**E60,991**
C: -15° to +105°	**(1° divisions)**	**E60,992**



ONE INCH DIAL DIGITAL POCKET THERMOMETER

Clips to your shirt pocket so you are always prepared. Features LCD readout, 1/10°F resolution, ±2°F accuracy, 4" stainless steel stem (.136"dia.), over/under range indicator, frequency update selection (slow/fast) and protective pocket case. Powered by 1.5V silver oxide watch battery (included).

Dial Thermometer	**$25.95 Each**
0° to 160° F	**E37,328**
-40° to 120°F	**E37,329**
+68° to 230°F	**E37,330**



HIGH QUALITY LAB THERMOMETER

Partial immersion thermometer. Unit has white background with mercury in glass. 300mm long. Range of temperature 30 to100°C and is graduated at every degree.

Thermometer E71,776 $7.75
3 or more, $6.75 Each

BI-METAL DIAL FACE THERMOMETERS

• Stainless Steel Construction
• Re- Calibration Adjustment
• High-Impact Plastic Dial Face
• 1% Full Scale Accuracy

Stock No.	Range	Divisions	Face Dia.	Stem Length	Price
E36,319	Dual—25 to 125°F and -5 to +50°C	1°F, 1°C	2"	8" (201mm)	$23.95
E36,320	Dual—0 to 220°F and -10 to 100°C	2°F, 1°C	2"	8" (201mm)	$23.95
E36,321	-40 to +160°F	2°	1-1/8"	5" (127mm)	$15.95
E36,322	50 to 550°F	5°	1-1/8"	5" (127mm)	$15.95
E36,323	0 to 220°F	2°	1-1/8"	5" (127mm)	$15.95
E36,324	25 to 125°F	1°	1-1/8"	5"(127mm)	$15.95

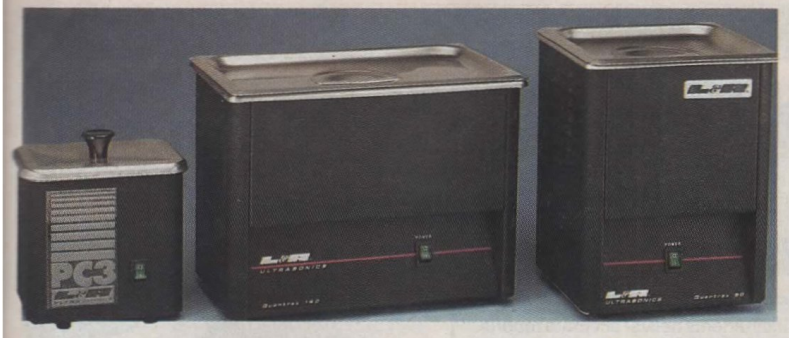
PROFESSIONAL GEIGER COUNTER

Survey meter for field and laboratory use. Excellent for checking the radioactive contamination of work areas, personnel and instruments, detecting stray radiation from containers, locating spilled radioactive chemicals and similar applications. A rugged, two piece, fiberglass reinforced polyester resin case with a neoprene O-ring gasket, large mill. spec. ruggedized meter indicator, fully transistorized, corrosion resistant, regulated high and low voltages insures dependable results. Audible, for aural monitoring. 2 "D" batteries (not incl.). Detects Alpha (above 4 MeV), Beta (above 70 KeV), Gamma (above 6 KeV), and X-ray. 4-1/4" x 7-3/4" x 8"; 4 lbs. 11 oz. Instructions included.

SPECIFICATIONS:

Ranges: 0-200, 0-20, 0-2, 0-0.2mr/hr.; **Precision:** Within 10% of full scale at standard temperature over operating range.
Audible: 1.5 inch audio transducer.
Saturation: In excess of 1000 R/hr when calibrated and maintained properly.

Geiger Counter E17,006 $625.00



QUANTREX ULTRASONIC CLEANERS

- **Solid State Circuitry**
- **Stainless Steel Tanks**
- **30 Minute/Hold Timer Option**
- **Solution Heater Option**

Ultrasonic refers to sound vibrations (42 - 43 kHz) whose frequencies are beyond the auditory limit, which are radiated through a fluid medium. The result is billions of minute bubbles which create a scrubbing or cleansing action on immersed components or materials. The bubbles are especially effective, penetrating crevices, corners, recesses and other inaccessible areas.

STOCK NUMBER	TANK CAPACITY	DESCRIPTION	TANK DIMENSIONS L x W x D (Inches)	OVERALL DIMENSIONS L x W x D (Inches)	WATTS FREQ/KHz	IMPUT	PRICE
E33,697	18 oz.	Most compact unit, on/off switch with pilot light	4-3/4x3-1/2x2-1/2	5x4-1/4x4-3/4	70w	0.3Amp 22W	$139.00
E33,625	18 oz.	Kit with above unit plus basket, two 100ml beakers and positioner	4-3/4x3-1/2x2-1/2	5x4-1/4x4-3/4	70w	0.3 Amp 22W	$180.00
E39,259 E39,260	1-1/4qts. 1.2L	On/off switch w/pilot light As above, with timer	5-3/8x5-3/8x3	6-1/8x6-1/8x7-5/8	105W 43KHz	0.3 Amp 35W	$239.00 $297.00
E85,126 E39,261 E39,262 E39,263	2 qts. 1.9L	On/off switch w/pilot light As above, with timer As above, with heater As above w/heater & timer	5-7/8x5-3/8x4	6-7/8x6-3/8x8-7/8	160W 43KHz	0.5 Amp 55W 0.5Amp 103W	$295.00 $319.00 $337.00 $365.00
E39,264 E39,265 E36,327 E36,328	3-3/8 qts 3.2L	On/off switch, pilot light, stainless drain As above, with timer As above, with heater As above, w/heater & timer	9-3/8x5-3/8x4	10-3/8x6-3/8x8	270W 43KHz	0.8 Amp 95W 0.8 Amp 150W	$425.00 $439.00 $453.00 $483.00
E39,266 E85,128	6 qts. 5.7L	On/off switch, pilot light, drain and timer As above, with heater	11-3/4x6x6	12-5/8x6-7/8x9-3/4	400W 43KHz	1.2 Amp 135W 1.2 Amp 275 W	$679.00 $729.00
E39,267 E39,268	11 qts. 10.4L	On/off switch, pilot light, drain, timer, fan cooled As above, with heater	11-3/4x9-3/8x6	12-5/8x10-3/8x11-1/8	720W 43KHz	1.9 Amp 225 W 1.9 Amp 435W	$889.00 $989.00
E39,269 E39,270	13 qts. 12.3L	On/off switch, pilot light, drain, timer, fan cooled As above, with heater	15-1/2x9x6	16-1/2x10x12	850W 42KHz	2.6 Amp 300W 2.6 Amp 600 W	$1,039.00 $1,099.00
E39,271 E39,272	26 qts. 24.6L	On/off switch, pilot light, drain, timer, fan cooled	19-3/4x11-3/4x6-1/2	21-3/4x13-3/4x13-1/4	1230W 42KHz	3.5 Amp 410W 3.5 Amp 1010W	$1,599.00 $1,649.00

ACCESSORIES

Basket: For #33,697 (18 oz. unit) E33,626 $39.95

Chairside Assembly: For #33,697. Consists of: (2) 100ml beakers with bands and (1) position cover. E33,627 $24.95

Replacement Basket: For 6 qt. unit (#85,128) E37,684 $110.00

Replacement Basket: For 3-3/8 qt. units (#36,327 and #36,328) E37,685 $77.00

Mini Parts Basket: Globe-shaped basket with spring handle accepts small parts up to 1-1/4" diameter. Entire unit then goes into large tank. E37,686 $9.95

Ultrasonic Cleaning Fluids In One Gallon Containers

General Purpose Cleaner: To remove generic soils, oils and dust. E37,581 $37.95

Special Formula Optical Cleaning Solution: Full strength; for eyeglasses and lenses. E33,696 $26.95

Aqua Sol Cleaning Solution Concentrate: Water soluble to remove waxes, oils, buffing compounds, etc. from most metals, glassware and plastics. E37,582 $52.00

Hydro-Sonic Cleaning Solution Concentrate. Designed to remove water-soluble soils from most metal parts, glass, lab and surgical equipment. E37,583 $52.00

Power NoFome Instrument Cleaning Solution: Dissolves gummed oil and grease on minute instrument parts. Especially for mechanical cleaning. Requires rinse solution below. E37,584 $28.00

NoFome Rinse Solution. Required for above. E37,652 $21.95

MONITOR 4 & 5 RADIATION MONITORS

- **Detect: Alpha, Beta, Gamma, X-Rays**

Feature easy to read analog meters, red light count, anti-saturation circuitry and audible beeper .

COMMON SPECIFICATIONS:

Ranges: x1, x10, x100 and BATT (battery check)

Power: One 9 volt alkaline battery provides up to 2,000 hours of operation at normal background levels.

Temperature: -20°C to +50°C

A) MONITOR 4

Detector: Uncompensated halogen-quenched with 1.5-2.0 mg/cm² mica end window.

Energy Sensitivity: Detects Alpha down to 2.5 MeV through the end window; typical efficiency at 3.6MeV is greater than 80%. Detects 50 KeV Beta at 35% typical efficiency; 150 KeV is typically 75%. Detects Gamma and X-rays down to 10 KeV through the end window, 40 KeV mnimum through the case.

Meter Reading: 0-50 mR/hr and 0-50,000 CPM, or 0-500 uSv/hr and 0-50 mR/hr

Monitor 4 Meter E31,475 $259.00

B) MONITOR 5

Provides high sensitivity and reproducibility. The large GM detector is located on the back of the instrument providing the user with a full view of the meter and count light.

Detector: Halogen quenched uncompensated GM with mica end window, 1.5-2.0 mg/cm² in thickness. Effective diameter is 1.13 in./28.58mm.

Energy Sensitivity: Gamma sensitivity is 25 cps/mR/hr. Smallest detectable level of I-125 is approx. 0.02uCi. Recommended use is for .5mCi and up. Typical detection efficiencies (2 pi geometry) are as follows:

Sr-90 (.0201µCi)	0.200-0.544	49%
Tc-99 (.043µCi)	0.085-0.295	33%
Cl-36 (0.0214µCi)	0.252-0.714	47%
Pm-147 (.126µCi)	0.062-0.225	22%
Bl-210 (.0255µCi)	0.390-1.161	36%
C-14 (.130µCi)	0.049-0.15	21%

Meter Reading: 0-500, 0-5,000, 0-50,000 CPM

Monitor 5 Meter E38,587 $399.00

C) SURFACE CONTAMINATION MONITOR

Check bench tops, clothing, etc. for radioactive contamination. Also useful in geology. Hand-held monitor reads radiation in counts per minute and mr/hr. Sensitive to Beta radiation over 20KeV, Gamma and X-ray over 5KeV, plus Alpha. Due to thin, large (1-3/4" dia.) window, unit is extremely sensitive to carbon 14/sulphur-35 and Iodine 125. Side mounted speaker. 2-1/2" meter has 3 ranges, 0-500, 0- 5000, 0-50,000cpm. (0-15, 1.5, 15 mr/hr). Three position switch, off/battery test, X100, X10, X1. Antisaturation circuit will not fall below full scale in high fields, (tested to 100 r/hr). Detector features 2" dia. pancake GM tube, window thickness is only 1.5mg/cm². Efficiency is 100% for all Betas and Alphas that have the energy to penetrate the thin window. 3"W x 5-1/4"L x 6" High, including swivel handle; 22 oz. One 9 Volt battery (not included).

Monitor E37,687 $535.00

DEVISE YOUR OWN WEATHER STATION

Choose the components you want for your own weather station. Huger's line of professional instruments are attractive and functional with West German craftsmanship and accuracy. Brass frames. Dials have white backgrounds with black markings. Frames have pre-drilled mounting holes. All have outside diameter of 3-1/4".

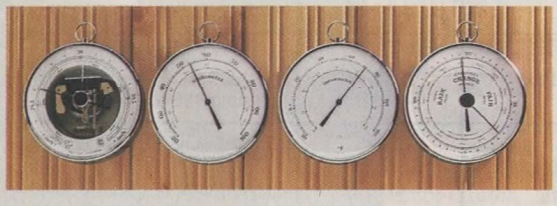
Comfort Meter. Combines a thermometer with Fahrenheit readings and a hygrometer that measures relative humidity. Shows the ideal comfort zone readings. **E36,792 $34.95**

Hygrometer. Relative humidity from 20 to 100%, calibrated every 1%. **E36,793 $28.95**

Thermometer. Temperature readings in both Celsius and Fahrenheit calibrated every degree. 10 to 125°F range. 6-55°C range. **E36,794 $28.95**

Barometer. Measures change in barometric pressure in inches and fractions thereof. Built-in pointer lets you measure any change over a set period. **E36,795 $39.95**

Quartz Clock. Roman numerals and sweep second hand. Battery powered. **E36,796 $44.95**



PRECISION WEST GERMAN LARGE 5-INCH DIAL WEATHER INSTRUMENTS

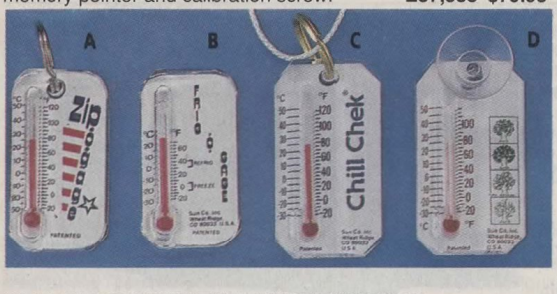
Manufactured by Huger , each instrument features: a large 5-inch white dial face with black numerals, beveled glass cover, chrome dial ring and black metal body. Indoor mounting or protected outdoor areas . Overall diameter of case is 5-1/8" x 1-3/4" thick.

Thermometer: -20° to +120°F/-30° to +50°C in 2° increments. **E37,585 $79.95**

Hygrometer: Measures relative humidity 20% to 100% in 1% increments. **E37,586 $79.95**

Barometer With Visible Works: Measures barometric pressure in inches 29.2 to 30.8 in 0.01 increments and in mbar. Built-in memory pointer, calibration screw. **E37,587 $79.95**

Full Range Barometer: Measures barometric pressure in inches 28.0 to 31.9 in 0.02 increments and in mbar 950 to 1070. Built-in memory pointer and calibration screw. **E37,588 $79.95**



KEY CHAIN MINIATURE INSTRUMENTS

Each measures approximately 2" long x 1" wide and weighs only 1/3 oz. Sealed in clear acrylic cases.

1) Line/Surface Level: Read level directly on surfaces or attach to string for long spans. Key chain ring on bubble level. Not shown. **E36,690 $4.25**

A) Jacket Zipper Thermometer: Attaches directly to jacket zipper. Reads -20° to 120°F or -30° to 50°C. Wind-chill chart on back. Key ring. **E36,691 $4.25**

B) Refrigerator/Freezer Thermometer: Adhesive mount attaches to inside wall. Reads -20° to 60°F or -30° to 20°C. **E36,692 $3.95**

C) Water/Air Sportsman Thermometer: Waterproof to 200 ft. With brass key ring and nylon lanyard. Reads air or water -20° to 120°F or -30° to 50°C. **E36,693 $4.75**

D) Window Thermometer: Encapsulated thermometer with reversible suction cup. Sticks on inside/outside of window. **E36,694 $3.95**

HUGER WEATHER INSTRUMENTS

Large, easy-to-read instruments deliver accurate reports of atmospheric conditions. West German precision-made instruments. Elegant black metal finished frames. White face with black numerals and letters. Glass dial is 3-1/2" diameter. Frame is 4-7/8" diameter.

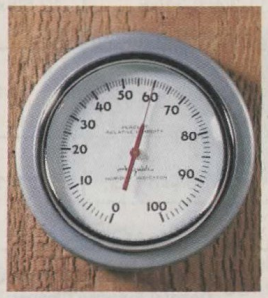
Barometer. Measures change in barometric pressure in inches and fractions thereof. Measure the change over a set period with the built-in pointer. Adjustment screw and mounting hole on back. **E35,312 $49.95**

Hygrometer/Thermometer. Hygrometer measures relative air humidity by means of the coating on a metal spiral which is connected to a pointer. Temperature gauge measures in Fahrenheit. With mounting hole. **E35,313 $49.95**

HUGER OUTDOOR WEATHER STATION

Precision weather station features large 4" dia. barometer (28.9 to 31.9 inches in 0.2 increments), 1-1/2" dia. hygrometer (20 to 100% rel. humidity in 1% increments), 1-1/2" dia. thermometer (-30° to 110°F in 2° increments). Housed in an all brushed aluminum frame 7-1/2" H x 6-1/8" W with 3-1/2" wide protective hood, four pre-drilled mounting holes. Must be mounted in a protected area such as porch or overhang.

Outdoor Weather Station **E37,589 $135.00**



DIAL GAUGE HUMIDITY INDICATOR

- **Ideal For Computer Rooms**

Precision humidity indicator is ideal for computer room monitoring, clean rooms and industrial storage control. Gray metal case with white dial and black graduations, 4-5/8" dia. Range is 0 to 100% in 1% increments.

Humidity Gauge **E33,413 $24.95**

THIS HANDY BAROMETER SITS ON YOUR DESK

Barometer is calibrated in inches, centimeters, and millibars of mercury. Measures air pressure changes to predict weather changes. Gilded case has a four inch silver dial with black numerals and gold set hand.

Desk Barometer

E41,951 $36.00

POCKET WIND METER MEASURES WIND SPEED INSTANTLY

Rugged enough for seagoing use, this practical device has two scales. One is graduated 2-10mph in 1/2mph increments, the other from 10-66mph in 2mph increments. Case included. 1-1/2" x 6-5/8" x 5/8" .

Wind Meter

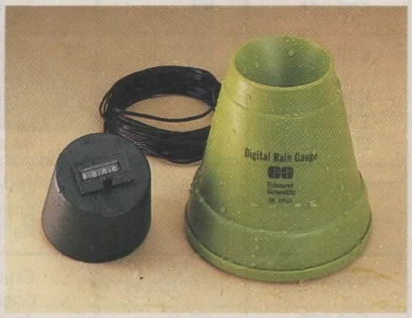
E60,349 $14.95

POCKET WEATHER FORECAST RADIO

Pocket-size radio travels with you everywhere and receives the latest official forecasts from one of over 350 U.S. NOAA weather stations located throughout the U.S., operating 24 hours a day. Featuring crystal-controlled circuitry for precise drift-free reception. Powered by 2 "AAA" batteries (not included), on/off/volume control switch and telescoping antenna. Dimensions: 4-3/8" L x 2-5/8" W x 3/4" T.

Pocket Weather Forecaster

E38,500 $39.95



COLLECT AND MEASURE RAINFALL AUTOMATICALLY

Sturdy, weather resistant digital rain gauge lets you complete rainfall statistics for hour, day, week or month. Measures rainfall in tenths of an inch. Registers up to 999.9" (calibrated to 1/10"). Measures 6" x 5-1/2" x 2-3/4", mounts easily. Includes 30 feet of weatherproof cable. Operates on one 9V battery (not included).

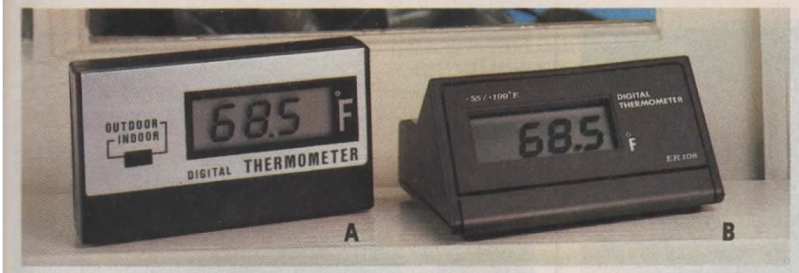
1/10" Rain Gauge **E72,165 $79.95**

1/100" Calibrated Rain Gauge. Same features as above but with 1/100" calibration to 99.99" . **E72,319 $109.95**

PRECISION TIDE TIMER

The Tide Timer is already a fixture in over 100,000 homes along the Atlantic coasts of America and Europe. And now the Tide Timer is the only tide clock able to be used on the Pacific coast of the U.S. and Canada—because of the special copyrighted, computer-generated starting tables. In the mid-Pacific and in the Gulf of Mexico, above Naples, the tides are so irregular that even the computer programmer couldn't devise tables. The Tide Timer's precision quartz movement is made specially in West Germany by Junghans, the world's largest manufacturer of battery operated clock movements. There Are No Better Movements Made. Blue and white unit measures 6" H x 6" W x 1/2" thick and has a clear acrylic base. Powered by a single "C" battery. Easy to set, the next high tide is all you need. Full instructions included.

Tide Timer **E35,261 $44.95**

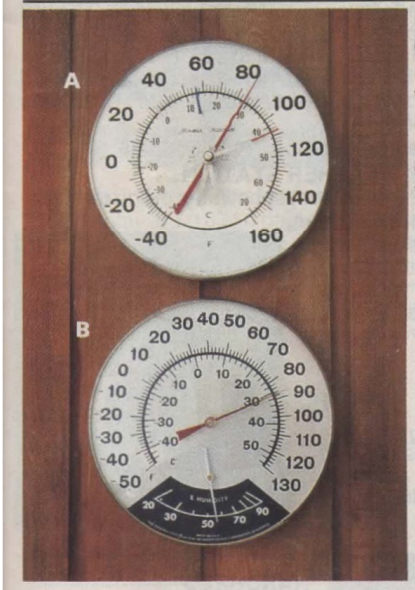


HOW COLD IS IT. . . OUTSIDE OR INDOORS?

- **Digital Display, 1/2" Numerals**
- **-40°F To 199°F Range**
- **±1.8°F (0°F ~ 140°F) Accuracy**

Our famous Indoor/Outdoor digital electronic thermometers are both dependable and accurate. We have utilized specially-designed sensors and circuitry similar to components found in laboratory-grade instruments. Both the wall-mounted and desktop/windowsill models feature large, easy-to-read digital displays and a five-foot-long wire lead sensor to mount outside. Each is powered by a single 9 volt battery (not included). Response time on each unit: liquid (from 32°F to 199°F) - 30 seconds, saturated; air - 3 to 5 minutes, saturated.

Model	Wall Mount (A)	Desktop/Windowsill (B)
Measurements	2" Hx3" Lx1-1/2" W	1-3/4" Hx3-1/2" Lx3-1/2" W
Weight	6 oz.	6 oz.
Number	E34,005	E36,091
Price	$28.95	$29.95



LARGE 12" DIAL THERMOMETERS

Our large dial instruments with bold numerals are easy to read from a distance. Constructed of steel and aluminum and encased in a high-impact acrylic crystal, these instruments are durable and weather resistant. Suitable for indoor or outdoor hanging.

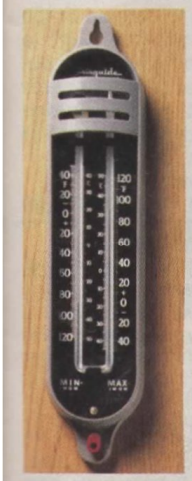
(A) Jumbo Mini-Max records the high and low temperature of the day with color code indicators. Also gives current temperature. Ideal for recording weather patterns or internal heating variations. Calibrated in Fahrenheit and Celsius.

Jumbo Mini-Max E72,467 $19.95

(B) Dual Temperature/Humidity indicates both the current temperature in Fahrenheit and Celsius, plus the humidity level on a separate scale. Ideal for sensitive environments.

Temp./Humidity Thermometer E72,468 $19.95

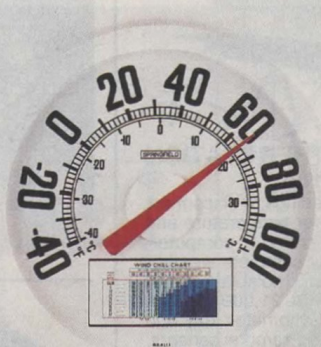
MINI/MAX THERMOMETER RECORDS HIGH/LO TEMPERATURE



- **-40° To 120°F**

Track both the highest and lowest temperature each day or for extended periods. Self-registering unit from Displays both the current temperature and the high and low. Reset the mercury with handy magnet mounted on unit and start a new tracking period. Calibrated in 2° increments, range is from -40° to 120°F. Sturdy plastic case is weather resistant and made for outdoor mounting. Measures 2-1/2" W x 10-1/2" H, includes reset magnet and mounting hardware.

Mini/Max E71,478 $25.95



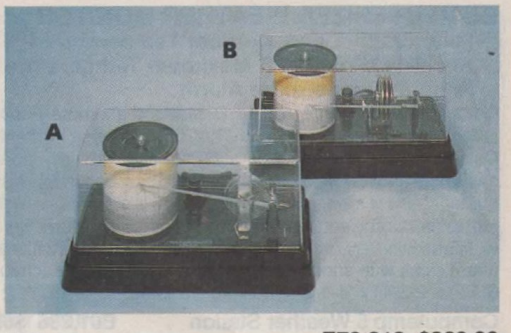
GIANT 18" DIAL THERMOMETER

Our largest dial thermometer features very bold graphics for easy reading from afar. Calibrated in both Fahrenheit (-40 to 100°F) and Celsius (-40 to 40°C), plus it has a wind chill chart. Made of high-impact weather resistant plastic for outdoor durability.

18" Thermometer E34,040 $24.95

(A) RECORDING THERMOMETER

A sensitive instrument for meterologists and experimenters. Magnified pointer motion gives instant response to temperature variations. Records from -40° to 120° Fahrenheit. Includes thirteen weekly charts, ink and instructions. 115V AC. 60Hz. 12-1/2" L x 6-1/2" W x 6-1/2" H.



Recording Thermometer E70,312 $360.00
52 Extra Charts E90,045 $18.00

(B) RECORDING BAROMETER

A sensitive, precision instrument for the professional meterologist or serious amateur. Combines a universal range and magnified pointer motion for instant response to pressure changes. Responds with practically no observable lag when pen motion changes. With a range of 29" to 31" of mercury, it provides a weekly record of pressure changes. Effectively operates at any altitude from sea level to 10,000 ft. Includes 52 weekly charts and instructions. 115V AC, 60 Hz. 12-1/2" L x 6-1/2" W x 6-1/2" H.

Recording Barometer E70,600 $310.00
52 Extra Charts E90,044 $18.00

PROFESSIONAL WEEMS & PLATH BAROGRAPH

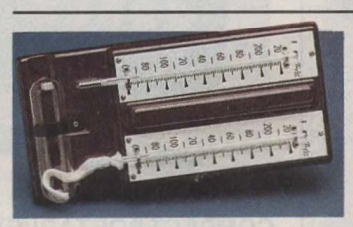
Classic mahogany and brass instrument is made in West Germany. Precision recording barometer features a battery powered (1"AA") quartz movement and eight bellows for accuracy. Range of mercury is 28" to 31" . The hinged case is 10" long x 6-1/2" wide x 6-1/2" high with a 3-5/8" dia. x 3-5/8" wide drum. Weighs 6.5 lbs. Includes a one year supply of weekly charts, felt-tip nib and instructions.

Barograph E36,150 $850.00
Extra Charts
(For 104 weeks) E36,151 $37.95
Extra Felt-Tip Nib E36,152 $13.95

CHART ATMOSPHERIC CONDITIONS WITH EDMUND SCIENTIFIC'S DAILY LOG

Daily weather log lets you register the atmospheric conditions for an entire year, including temperature, humidity, air pressure, cloud formations. Oversize paperback with spiral binding on edge so log lays flat.

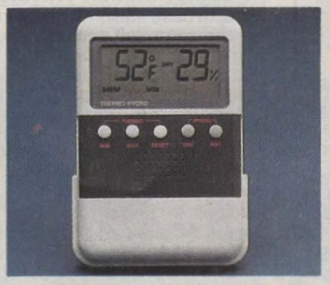
Daily Weather Log E9572 $9.75



WALL MOUNT HYGROMETER

Wet and dry bulb thermometer for the determination of relative humidity. Mahogany finish on molded case. 8-7/8" x 4-1/4" . Range 60° - 220°F. With wick and tables. Weight: 10 ozs.

Hygrometer E36,153 $54.00



DIGITAL MINI-MAX THERMOMETER - HYGROMETER

- **F° or C° Selectable Temperature**
- **Min - Max Memory Thermometer and Hygrometer**
- **Hygrometer % Relative Humidity**

Read temperature and humidity and record minimum and maximum readings for both. Compact unit 4"L x 2-2/4" W x 5/8"T . Mounts on any wall with self adhesive slip-in mount. Powered by two "AAA" (um-4) batteries, included. Weighs 3 ozs. Relative humidity measurement is temperature compensated.

SPECIFICATIONS:

	Thermometer	Hygrometer
Range:	32° To 122°F (0 to 50°C)	25% To 95% RH
Accuracy:	± 2°F (32 to 104°F)	±5% RH (40 To 80%RH)
	±4°F (over 104°F)	±7% RH (under 40%, over 80%)

Digital Mini-Max Thermometer/Hygrometer E39,228 $40.00

COMPUTERIZED WEATHER MONITOR

- **Monitors Indoor & Outdoor Temperature**
- **Records Minimum & Maximum Temperature**
- **Remote Temperature Alarm**

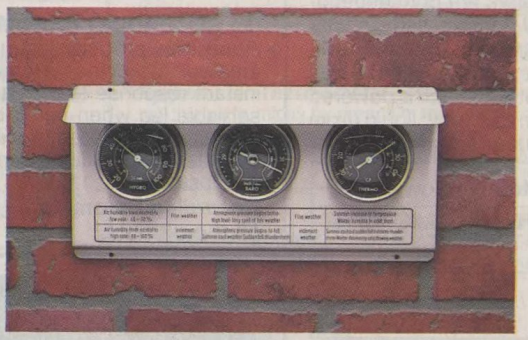
Computemp 5's large red LED readout alternately monitors indoor and outdoor temperature and time. Choose Fahrenheit or Celsius display, or both alternating. 24 hour memory stores the day's high and low readings and the time they occurred. A 30-foot outdoor sensor monitors air, soil or water temperature, while a 6-foot indoor probe senses air or spa water temperature. Set alarm to sound when temperature reaches a desired level. Also an alarm clock with snooze setting. All sensors are detachable. 6-1/2" x 2-3/4" x 4-1/2". 120 volt. UL listed.

Computemp 5 Weather Station E61,236 **$89.95**

INSTANT WEATHER REPORTS

Determine the atmospheric conditions where you live with this West German-made weather station. Indoor station delivers a reliable account of today's atmospheric conditions and an accurate prediction of tomorrow's outlook. Color-coded lights indicate air pressure tendency. Station also includes a barometer, hygrometer and thermometer. Black plastic frame, 11-5/8" x 4-1/2" x 2". 3-3/8" dials. Air pressure indicator requires one 9V battery, not included.

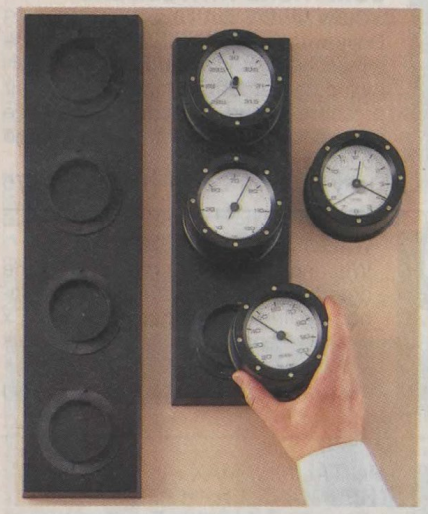
Weather Station E42,724 **$124.95**



HUGER'S OUTDOOR MONITORING STATION

Precision station from Huger provides the necessary atmospheric information necessary to devise your own forecasts. West German-crafted station includes a hygrometer for measuring relative air humidity, a thermometer with readings in both Celsius and Fahrenheit and a barometer for determining changes in atmospheric conditions. Instruments are housed in weather resistant brushed aluminum finish 15-3/8" x 7-1/8" frame. Instruments have 3-3/8" dials, black background, white letters and numerals and glass covers. Delivers accurate forecasts of the conditions, both today and what's ahead. Frame has four pre-drilled mounting holes. Barometer has sensitivity adjustment screw.

Outdoor Weather Station E35,311 **$160.00**



DEVISE YOUR OWN WEATHER STATION

Huger precision crafted West German-made instruments let you forecast the weather where you live. Choose among three sensitive weather instruments, a quartz clock and mounting frames. Instruments have varnished black metal frame, 3-5/8" diameter. 2-3/4" dial. Fine adjustment screw and mounting hole in back.

Barometer (Inches) E35,314 **$39.95**
Temperature (Fahrenheit) E35,315 **$27.95**
Hygrometer (% relativity) E35,316 **$27.95**
Quartz Clock. Sweep second hand. Takes one nine volt battery (not included). E35,317 **$46.95**

Three Opening Frame. 13-1/4" x4-3/8" Black wood and plastic. E35,318 **$39.95**
Four Opening Frame. 17-3/8" x4-3/8". E35,319 **$34.95**

COMPACT PORTABLE WEATHER STATION

- **Weather Station Travels With You**

Set up a base station for full-function readings or disconnect the computer unit and take it with you for temperature and altimeter readings. Compact 2-7/8" x 5" x 1-1/4" computerized instrument combines an unusually complete weather station with an electronic altimeter. Altitude is displayed in 10 foot increments from below sea level to 21,000. Station functions as a precision barometer, thermometer, day and date quartz clock and stopwatch. Using remote sensors, station also can indicate wind speed, wind direction, daily rainfall, cumulative rainfall and remote temperature. Displays readings in English or metric. With remote temperature sensor, AC adapter and manual. Station operates from AC adapter, "AAA" Ni-Cad batteries (not incl.) or car cigarette lighter adapter (not incl.). Weighs 4 oz. without power source.

Complete Ultimeter Weather Station. Includes altimeter, anemometer/wind vane and rain gauge. E35,353 **$479.95**

Ultimeter Weather Station and Altimeter Only E35,320 **$359.00**
Anemometer & Vane Only E35,351 **$169.95**

ORACLE 1 WEATHER STATION WITH DIGITAL READOUT AND FULL DATA MEMORY

Oracle 1 Weather Station provides all of the information necessary to accurately identify and predict meteorological change. Time is displayed 3 different ways. 12 hour format.

Temperature: Range: -40°F to +127°F. Max. & Min. recorded on all temperatures. Accuracy: ± 1°.
Barometer: Range 28-32 inches of Mercury. Max. & Min. recorded. Accuracy: ± .1 inch of Mercury. Resolution .01 inches of Mercury. Altitude adj.: to 10,000 ft.
Wind Direction: Scale: 0-360° by 10° increments. Accuracy: ± 5°.
Wind Speed: Range 0-150mph. Accuracy: ±2% of full scale at upper & lower ends. ±1% at 35mph.
Wind Chill: Range: -127°F to +85°F. Wind Speed & Temp. are fed to the microprocessor, resultant Wind Chill & Temp. are displayed. Accuracy: ±2°F. Unit comes with 50 ft. of cable.

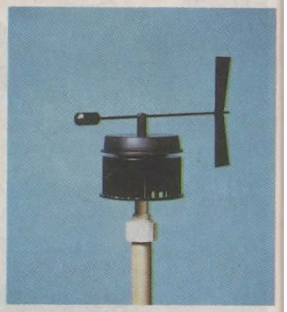
Oracle 1 Weather Station E36,686 **$625.00**

ORACLE 2® WEATHER STATION

The Oracle 2 (not shown) substitutes inside temperature for barometric pressure and provides a less expensive alternative for weather watching. It is identical to Oracle 1 in all other respects.

Oracle 2
E38,110 **$595.00**

Longer length cable available at $39.00 per 50 ft. increments only. **Special Order #38,111** *and specify length (max. 500 ft.).*



HANDHELD ANEMOMETER HAS A BUILT IN COMPASS

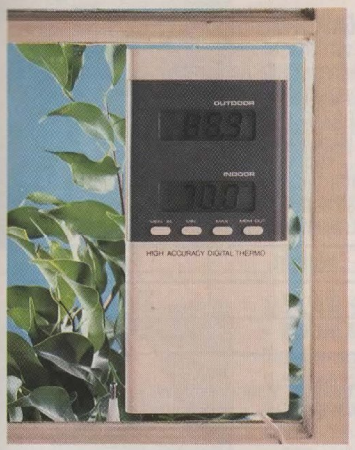
The compact 7-1/2" high, lightweight (1 lb.) unit is sensitive enough to catch a 5mph breeze yet rugged enough to read a 70mph gale. It's accurate to 3% of full scale. Self-contained, it requires no batteries, adjustments or recalibration.

Anemometer
E42,547 **$105.00**

TURBINE WIND SPEED INDICATOR IS POCKET-SIZE

Based on the principle that a freely turning turbine will rotate at a speed directly proportional to wind speed. Sapphire jewel bearings. Measures miles per hour (0-99.9), knots (0-87.9), feet per minute (0-8790) and meters per second (0-44.8), 3% or better accuracy. 1.16" x 2.6" x 4.65". Weighs 3 oz. Operates in temperatures from 32° to 122°F. Takes 3 "AAA" batteries (not included).

Turbo Meter
E34,793 **$130.00**



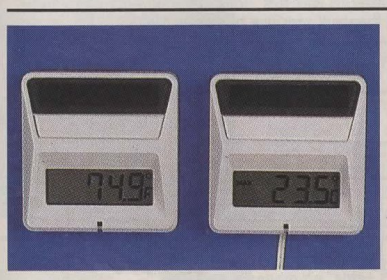
DIGITAL MINI-MAX INDOOR/OUTDOOR THERMOMETER

- **F° or C° Selectable**
- **Mini-Max Memory For High & Low**
- **Indoor or Outdoor Switchable**

Read indoor or outdoor temperature and record the high and low readings for any period or day you select. Modern Hi-Tech case measures 7" Lx3-1/4" Wx3/4" Thick and mounts on any wall. Requires 2 "AA" batteries, not included, and comes with 10 foot outdoor probe sensor cord. Weighs 5 ozs.

SPECIFICATIONS: **Range:**
Indoor: +23°F to +122°F; -5°C to +50°C.
Outdoor: -40°F to +122°F; -40°C to +50°C.
Resolution: 0.1°C/0.1°F
Accuracy: ±2°F (4 ~77°); ±4°F (Other Ranges)

Mini-Max Indoor/Outdoor Thermometer **E38,038**
Regularly $46.00 On Sale $30.00

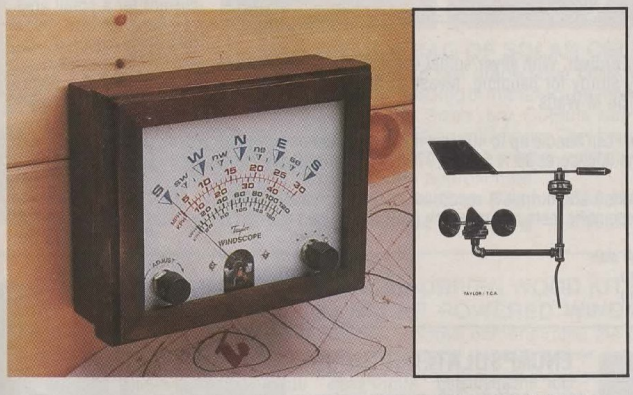


SOLAR POWERED DIGITAL THERMOMETERS

- **Indoor Or Outdoor Models**

Our compact 2-3/4" square x 3/4" thick digital thermometers are powered by a mini-solar panel with a 1.5V button battery (included) backup to allow continuous data display. Large 1/2" digit display to 1/10 of a degree. Switchable fahrenheit or celsius. Outdoor model comes with remote sensor and 10 foot cord. Easily mounts on wall or desktop.

	RANGE	ACCURACY
INDOOR	+23 To 122°F	±3°F (32~104°F)
E39,250		±4°F (Other)
$24.00	-5 To +50°C	±1.5°C (0~40°C)
		±2.0°C (Other)
OUTDOOR	-58 To +158°F	±3°F (25~170°F)
E39,251	±4°F (Other)	
$25.00	-50 To +70°C	±1.5°C (-4°~77°C)
		±2.0°C (Other)



PROFESSIONAL WIND MONITOR FOR HOME OR WORK. TWO WIND VELOCITY SCALES FOR PRECISE ACCURACY

Perfect for wind monitoring at home, office, farm, marina and airport, this precise unit mounts on roof, flagpole, barn, antenna, etc. with standard hardware. Easy-to-read indicator gives both wind speed & direction on one dial. 2-speed ranges; 0-25mph & 0-100mph, assure precise accuracy. Attractive, mahogany finished indicator; 6-3/8" x 5-1/8" ; mounts indoors. 24" high transmitting unit can be located up to 500 feet away. All outdoor components are corrosion resistant for long life & trouble-free, reliable operation. Uses "D" battery (not included). Has 60 feet of weather-resistant cable.

Professional Wind Monitor **E70,310 $525.00**

MODULAR "WEATHER CUBES" SYSTEM

- **Design Your Own Custom Weather Station**

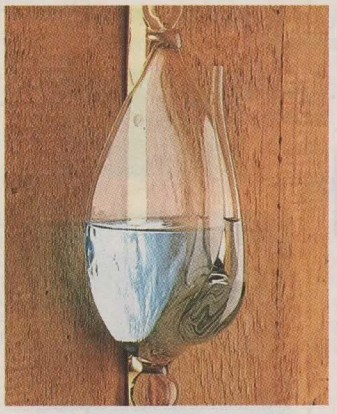
Weather cubes allow you to select just the instruments you require or to gradually build up a full function weather station. Each cube is housed in a beautiful hardwood instrument case 5" L x 3" W x 1-1/2" T with a brass face plate. Each is powered by a single 9 volt battery (not included). LCD readout. *Additional cable available by special order only.*

A) Outdoor Temperature Cube: Reads outdoor temperature, comes with outdoor sensor and 40 feet of cable. Range is -40°F to +127°F. **E37,760 $165.00**

B) Wind Speed Cube: Reads outdoor wind speed, comes with ball bearing multivane rotor which mounts on any standard 3/4" pipe and 50 feet of cable with plug-in connectors. Range is 0-99MPH. **E37,762 $179.00**

C) Rainfall Gauge Cube: Reads accumulated rainfall and current rainfall over any period you choose. Comes with weatherproof plastic collector (self-emptying design) and 30 feet of cable. Range is up to 99.99 inches in hundredths of an inch increments. **E37,763 $199.00**

D) Wind Speed/Direction And Outside Temperature Cube: Reads three different indexes on one cube: wind speed, wind direction and outdoor temperature. Comes with outdoor temperature sensor and speed/direction rotor/vane rooftop unit that mounts on a standard TV antenna mast, and 50 feet of cable. Range of temperature -40°F to +127°F, 0-99MPH, N-NE-E-S-SW-W-NW locations. **E37,764 $399.00**



HANDBLOWN WEATHERGLASS BAROMETER

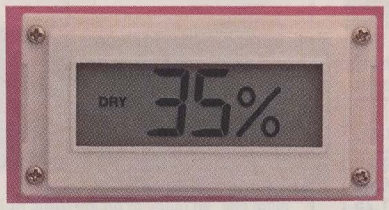
- **Accurately Forecasts Weather And Storms**

Weather forecasting just as it was three centuries ago. This authentic early barometer uses atmospheric pressure to show what weather to expect within the next 4 to 24 hours. As effective as a digital barometer, the weatherglass is a real historical conversation piece. Beautiful handblown glass bulb can be filled with colored tap water or alcohol and mounts to your wall in an attractive hanger. Simply watch the liquid level in the long curved spout.

1. A slow rise to the top of the spout signals an approaching storm 8-24 hours away. The storm may or may not change its course in that time.
2. A rapid rise to the top of the spout signals an approaching local storm. Any change of course will be forecast by an immediate return of the liquid to normal level.
3. Bubbling out of the spout signals a rapidly approaching local storm within only a few hours.
4. A rapid fall below the spout top during a storm means the storm is almost over.
5. A steady level halfway up the spout signals clear weather.

Glass measures 9"T x 3-3/4" W, mount is 12" T.

Antique Replica Glass Barometer **E35,490 $39.95**



Digital Module	**E38,788**
1 - 5 Pcs.	**$26.00 Ea.**
6 - 23 Pcs.	**$24.00 Ea.**
24 - 47 Pcs.	**$23.00 Ea.**
48 or More	**$22.00 Ea.**

PANEL MOUNT DIGITAL HYGROMETER MODULE

- **Ideal for Computer & Equipment Monitoring**

Compact hygrometer unit can easily be flush mounted in a panel or built into equipment to monitor relative humidity.

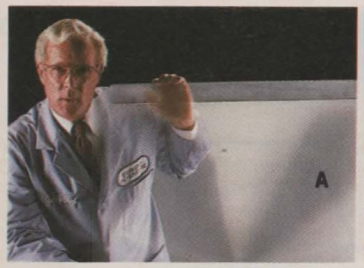
SPECIFICATIONS:
Panel Dimensions: 2-5/8" L x 1-3/8" H x -1/8" D
Panel Material: White Polystyrene
Power: 1.5V "AA" Battery (not included)
R.H. Range: 25% RH - 95% RH at 77°F
Accuracy: ±5% RH (40-80% RH at 77°)
67% RH (below 40% & over 80%)
Update Interval: 1 Second
Battery Life: 1 Year (approximate)

AIRCRAFT INSTRUMENT REPLICAS ARE WORKING CLOCK/THERMOMETER

Authentic replicas of familiar aircraft panel instruments that perform the functions of a clock or thermometer. Each measures approximately 6" diameter with mounting bracket on back. Both are powered by a single "AA" battery (included).

A) "Altimeter" Wall Clock: Replica of aircraft altimeter is actually a full function clock with hour and minute hands. **E37,615 $49.95**

B) "Airspeed Indicator" Thermometer: Replica of airspeed indicator is actually an indoor/room thermometer. Range is 40° to 150°F/10° to 70°C. **E37,616 $49.95**



LARGE FRESNEL LENSES FOR EXPERIMENTING OR BUILDING SOLAR FURNACES

A) Giant Fresnel Lens Melts Asphalt In Seconds!
Measures 31″ × 41″ × 3/16″. Focuses the light of the sun into industrial temperatures reaching 3000°F. For soldering, brazing and melting a wide range of metals. 40″ focal length. Build a giant solar furnace. Caution! **E31,139 $150.50**
2 or More $140.00 each

B) Large Fresnel Lens Is Ideal For Solar Or Optics Projects. Precision crafted lens has approx. 15″ f.l.; 50 lines per inch. Lens is approx. 11″ sq. and is 1/16″ thick. Unmounted lens comes with our 16 page book "Fun with Fresnel Lenses" which describes applications, how to build an overhead projector and more. Instructions included to build the 360° stand and frame depicted (frame not incl.) Frame allows you to use lens as a solar cooker for heating prepared foods, as a kiln for art work or other solar experiments. **E70,533 $26.50**

C) "Fun With Fresnel Lenses" Book. Clearly written book contains plans and instructions for building an image brightener, solar furnaces, camp cooker, overhead projector and camera obscura. Each requires only one Fresnel lens. **E9053 $5.25**

SPACE INDUSTRY "SUPER CELLS"

- **Highest Power Available For Their Size**
- **30% More Cells Fit In Same Space**

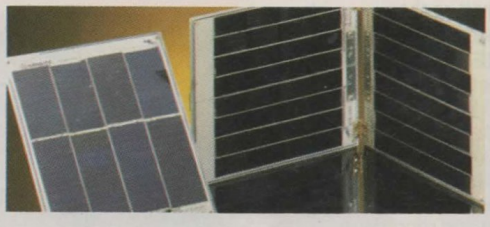
Designed for and utilized by the space industry, these super cells circle the earth and other planets as the primary power source on USA space shots and communication satellites daily. If reliability, power output, and size are prime consideration for your solar projects, use super cells. Cells are approx. 8 thousandths inch thick, lightweight and somewhat flexible with clean laser cut edges. Excellent light sensitivity, blue-grey color. All cells will have as a minimum silver coated P & N contacts which can be readily soldered with 60/40 solder and a mild flux. All cells tested under 1 sun condition. Electrical output is milliamps per sq. cm at .45 volts when tested at 28°C at high noon (short circuit current tested). Wire in series or parallel for any voltage or current combination.

Solar Cell Size	Full Sun Output	Voltage	# of Cells In Pkg.	Item #	Price
5 × 20mm	30mA	.5 volts	6	E37,336	$ 7.50
10 × 20mm	55mA	.5 volts	6	E37,337	9.00
20 × 20mm	125mA	.5 volts	4	E37,338	11.25
20 × 40mm	250mA	.5 volts	2	E37,339	14.25
40 × 40mm	500mA	.5 volts	2	E37,340	15.25

SOLAR POWER PACK

Portable & rechargeable. Provides electrical power to operate equipment in remote areas where line power is not available. Can be used to power lights, portable T.V., radio, clock or fan, etc. Power output can be switched for 6 volts or 12 volts. Contains 36 solar cells encapsulated on aluminum substrate. Blocking diode prevents overcharge. Unit can be recharged by sunlight or from any 12V vehicle. 6′ cord with cigarette lighter plug included. Battery is new (gates cyclon) high-power sealed lead acid rechargeable type which can hold a charge for one year (when unused). High impact carry case.

Voltage	Current	Watts	Dimensions W × L × D	Stock No.	Price
12V 6V	2.5 Amps 5 Amps	30	12¼ × 9¼ × 4¼″	E36,083	$235.00
12V 6V	8 Amps 16 Amps	96	13½ × 10½ × 4¼″	E37,343	$460.00

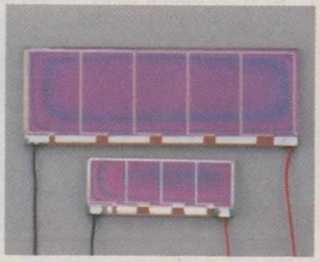


HIGHEST POWER-TO-SIZE RATIO PANELS

Same cells as those used in space satellites. Lightweight and durable design portable panels are 100% encapsulated, temperature and weather-proof. Constructed on an aluminum substrate, 5/32 screw terminal outputs with spade lugs on 12″ output wires, supplied with 4 ft. long cord and cigarette lighter adapter to trickle charge vehicle batteries. Instructions permanently silk-screened on panel rear. Suction cup mount. 3/16″ thick.

Stock No.	Output	Size	Weight	Price
E35,437	20V 250mA	7″ × 8″	9.5 oz.	$145.00
E35,438	20V 500mA	10½″ × 9½″	16 oz.	$215.00

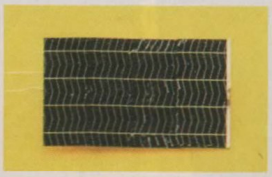
NEW FOLDING MODEL "FLAT PACK"
Same basic panel as above, hinged to double output and improve portability. Measures 7″W × 8″L closed, 7″W × 16″L × ¼″ thick opened. Output 36V-250mA/18V-500mA/9V-1000mA. **E37,341 $339.00**



AMORPHOUS SOLAR CELLS FOR LOW LIGHT LEVELS

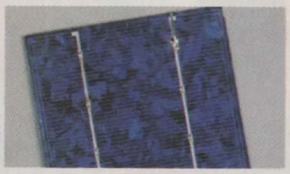
Amorphous (non-crystalline) solar cells on glass will produce sufficient voltage and current for low power devices in ordinary room light. Just the thing for research and development or science projects. Use to charge button cell batteries, as power supply for calculators, touch sensors and games. They can recharge or maintain power charge in watches, toys, hearing aids and various alarm devices. Wired in series, they will produce higher voltage.

1.5V DC 6μA. 1⅛″L × ½″W × 3/64″H, color-coded leads 1½″L. **E36,644 $4.00**
3V 10μA. 2⅛″L × ½″W × 3/64″H, color-coded leads 1½″L. **E36,646 $5.75**



SOLAR CELLS

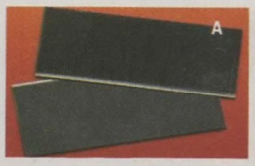
Cell Size L × W × T	Full Sun Output	Voltage	Comments	Stock #	Price
2⅛ × 1⅜ × ¼″	40mA	4.0V	Mounted in housing w/plastic condenser lens cover & 7″ leads; no diode; will charge NiCad batteries.	E31,279	$16.50
2¼″ dia. × .5mm	270mA	0.45V	crescent shape (¼ round)	E42,647	$ 7.50

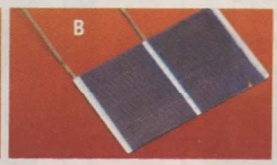


SEMI-CRYSTALLINE SOLAR CELLS

Convert sun or incandescent light to electricity. Each cell works from −65° to 125°C and has a clear protective coating. Conservatively rated at 100mW/cm² light intensity @ 0.45V, 25°C.

NUMBER	CELL SIZE	AMPS	VOLTS	PRICE
E35,727	95 × 95mm	2.0	.45	$ 7.00
E31,948	25 × 50mm	.2	.45	$ 5.50
E31,950	50 × 100mm	1.0	.45	$12.95
E35,726	75mm dia.	1.0	.45	$ 5.50





SPECIAL PHOTOVOLTAICS

A) High Output Satellite Cells
If your solar project requires extremely high current for a small area of photovoltaics, check this glass covered satellite cell, all ready to go into orbit or in your project. With silver/solder collector (front and rear) for easy low temp soldering. Due to glass bonding, this cell type is very sturdy for handling. Measures 20 × 60mm, full sun output 550mA/0.5 volts. (40mA per sq. cm, ISC) .45V × 35mA = 158 M Watts **E37,344 $14.95**

B) Light Concentrator Cell
Designed for space application, this solar cell can handle up to 40 suns if it is mounted on a large heat sink. Concentration can be accomplished with reflectors or fresnel lens. Measures 30 × 50mm, 375mA/0.5 volts, 0.5mm thick. **E37,345 $17.50**

C) Calibrated Solar Cell
Each encapsulated cell is individually calibrated and output is recorded on the rear panel. Measures 20 × 40mm, 300mA/0.5V. A necessary tool for solar installers, scientific tests and research projects. Silicon cell current outputs are linear to light input. **E37,346 $17.50**

Example: 300mA output = 100% of 1 full sun
150mA output = 50% of 1 sun
30mA output = 10% of 1 sun

ENCAPSULATED HIGH OUTPUT SOLAR CELLS

Our encapsulated "Mini-Panels" utilize solar cells similar to those that power our satellites in space, yet they are safe and simple to use. Mini-Panels allow for handling without the normal breakage and cell damage associated with solar cells. Eliminate 99% of cell breakage and damage when handling. Collect light from all angles with our unique lens pattern.

Item No.	Cells	Volts	Current	L × W × D	Price
E34,063	3	1.5	50mA	1¾ × 1 × ¼″	$ 8.00
E34,064	6	3.0	20mA	1¾ × 1 × ¼″	9.75
E37,332	1	.5	200mA	2⅛ × 1⅜ × ¼″	7.75
E35,397	1	.5	400mA	3 × 1¾ × ¼″	12.75
E37,333	12	6.0	50mA	3¾ × 2 × ¼″	22.50
E37,334	6	3.0	100mA	3¾ × 2 × ¼″	22.00
E37,335	3	1.5	200mA	3¾ × 2 × ¼″	22.00

GIANT MULTI-ELEMENT FRESNEL

Measures 34-1/2" L x 21" W with 15 individual 6-3/4" x 6-3/4" element panels in a 3 x 5 grid matrix. Each panel focuses as would an individual fresnel lens giving you in effect 15 hot spots. Originally designed for a solar energy concentrator application. Approximately 0.07" thick flexible acetate plastic sheet. Focal length 10".

Giant Multi Fresnel **E38,501 $99.00**

MYLAR SHEETING/SOLAR BLANKET

• Water & Windproof

Space-age insulating silver material. Reflects 90% of body heat back to the body. Provides emergency protection for campers, hunters, sportsmen. Compact, lightweight, opens to 78" x 53" . Won't crack, mildew or rot.

Mylar Sheeting/Solar Blanket

E60,636 $5.50

SOLAR FOREVER LIGHT. . . NEVER BE LEFT IN THE DARK AGAIN

Convenient little light will give you years of use and you will never have to change a battery or bulb. Energized by solar cells, it is entirely self-contained. Forever Light is easily rechargeable...just expose to sunlight for 2-3 hours and it's ready to give weeks of intermittent use. Unique semi-conductor LED emits a brilliant yellow light. A simple squeeze turns light on. Miniature size (1-7/8").

Forever Light **E34,969 $17.95**

18 INCH DIAMETER PARABOLIC REFLECTOR

A precision-made piece of scientific equipment originally designed as a light energy collector for a solar engine. Made of highly polished aluminum, it is 18" in diameter with a focal length of approximately 4.5 inches above the 1-1/8" center hole. Placed in bright sunlight it will collect and focus the sun's rays approximately 1/8" higher than its outer rim. Ideal for a broad range of applications including solar furnaces, solar energy collectors, and parabolic and directional microphones.

Parabolic Reflector **E80,254 $31.00**

CONCAVE MIRROR IS A 16 INCH DIAMETER REFLECTOR!

Glass reflector, aluminized on back surface. 15/16" deep. 22" F.L. 1/8" thick. Weighs 2 lbs., 8 ozs. Use to make solar furnace, solar reflector or light collector.

Concave Reflector **E80,097 $54.95**

GRAB A BAG OF SOLAR CELLS

Bags contain first grade solar cells which were broken or cracked in manufacture. Irregular sizes and shapes. Sizes vary. Outputs vary from 50 to several hundred milliamps. Can be soldered in series or parallel for greater voltage or current. Weights are approximate.

2 to 3 Ounce Grab Bag **E35,220 $10.75**
5 to 6 Ounce Grab Bag **E35,221 $16.75**

3 SOLAR-DRIVEN WOOD KITS

A) SOLAR POWERED WINDMILL KIT

Wooden windmill demonstrates the principle of solar energy and the free power available from the sun. Fun-to-build kit includes pre-cut balsa wood pieces, DC motor, solar panel, bonding agent and motor pulley. Motor spins the windmill blades from power generated by the solar panel. 3" x 1-1/2" solar panel has two-foot twin wire leads. Finished windmill stands 9" x 4" x 4". A most unusual conversation piece. Excellent solar demonstrator for those ages 8 and up. Wood pieces are unstained. **E35,863 $22.95**

B) Solar Helicopter Kit (Not shown)
E37,424 $22.95

C) Solar Airplane Kit (Not shown)
E37,425 $22.95

A. SOLAR POWERED NI-CAD BATTERY CHARGERS

Solar cell panels collect sun's rays or artificial light and convert to usable electricity. Place charger in sunlight during the day (southern exposure window is best), under a lamp in the evening for fully charged batteries in 48 hours (approx.). Chargers only.

Cell Size	Capacity	Dimensions	Item No.	Price
D	2	3-3/4" L x 2-1/2" W x 1-1/2" T	E34,061	$18.95
C	2	3-3/4" L x 2-1/2" W x 1-1/4" T	E34,060	$18.95
AA	4	3-3/4" L x 2-1/2" W x 3/4" T	E34,059	$28.95
9V	1	3-3/4" L x 2-1/2" W x 1/4" T	E34,062	$18.95

B. Rechargeable Batteries

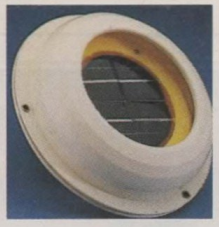
Top quality rechargeable batteries can be charged over 1,000 times. Suitable for 110V or solar powered chargers.

Package of:

Two "AA" Batteries	**E33,073**	**$7.49**
Two "C" Batteries	**E33,074**	**$9.25**
Two "D" Batteries	**E33,075**	**$9.25**
One Nine Volt Battery	**E33,076**	**$10.99**
Two "AAA" Batteries	**E36,437**	**$8.50**

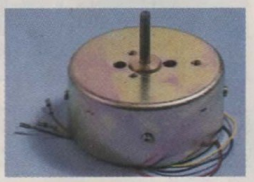
C. Standard Battery Charger. Charges combinations of: "AA" , "C" , "D", "AAA" and 9V batteries. **E33,077 $15.95**

SOLAR POWERED "SUNVENT" • CONTINUOUS VENTILATION



Provides continuous ventilation whenever there is sunshine. No batteries, wiring, plugs or noise. Photovoltaic solar cells convert the sun's energy into electricity which runs a low-noise motor that rotates the multi-blade fan. Designed to keep water and back drafts out. Sunvent extracts 680 cu. ft. of air per hour under normal working conditions. Unit requires 4-3/4" dia. hole for mounting and can accommodate up to 1-1/2" wall thickness as is (vent pipe can extend). 8-1/2" dia. overall, 2" outside protrusion, 1-1/2" inside protrusion.

Solar Sunvent **E37,342 $49.95**



DC REVERSIBLE MOTOR

Capstan four brush direct motor. Speed variable with your rheostat or by changing input voltage. Operates on 4 to 12V, DC 100mA draw. 3" dia. x 1-1/2" high. Shaft 1-1/8" L x 3/16" diameter. Made by Lear Jet. Surplus, new condition. Weighs 1 lb. 10 oz. 6" color-coded leads. Can be powered by batteries or solar cells, not included.

DC Motor **E34,065 $9.25**
3 or More, $7.50 Each

ULTRA MINI MOTORS

Micro size motors were originally designed to advance the film in disc cameras. Measure only 7/8" L x 11/16"W x 3/8" H with a 1/16" dia. x 5/16" long shaft. At 3 volts 200mA, they will do 7500 rpms. Ideal for hobbyists and model builders.

Package of 5 Motors **E35,128 $5.75**
5 or More Packages **$4.15 Each**
20 or More Packages **$3.40 Each**

EDMUND'S SOLAR ELECTRICITY KIT

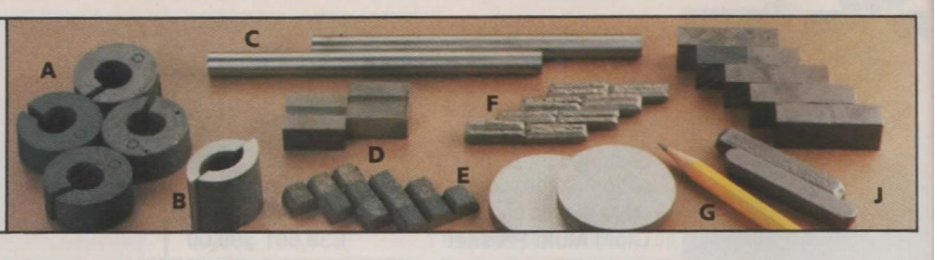
•Build A Solar Power Demonstrator
•Learn The Principles Of Solar Energy

Our kit consists of an encapsulated solar cell array, a high efficiency fractional horsepower miniature motor, a wind propeller, an optical illusion disc and a 12 page instruction manual. Build your own solar powered demonstrator, study the impact of artifical vs. sunlight and learn the basic principles of solar cell energy generation.

Solar Kit **E1231 $11.95**
Special—12 classroom kits. **E12,305 $129.95**

ALNICO MAGNETS

Permanent-magnet alloys containing aluminum, nickel, iron and cobalt. Heating, cooling and reheating give them a high degree of stability and strength, increasing resistance to demagnetization and force of field.

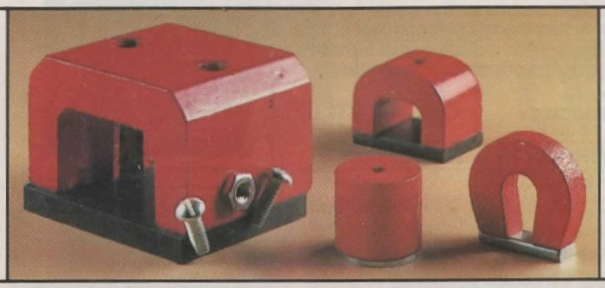


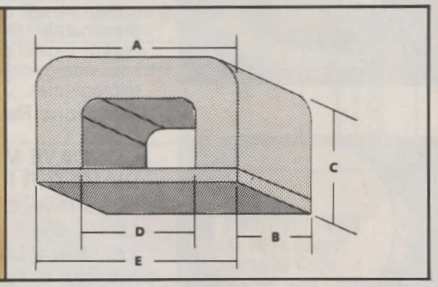
Shape	Size (Inches)	Thickness	Lb. Lift	Comments	Magnetized On*	Qty. per Pkg.	Number	Price
Cast Bar (F)	7/8 × 3/16	1/8"	2 oz.	Has N&S Poles	E	16	E40,860	11.00
Bar (J)	2 × 5/16	5/16"	3.2 oz.	Alnico	E	2	E42,421	6.25
Rectangular	1/2 × 1/2	1/4"	9 oz.	Beveled sides	E	5	E38,453	5.00
Rectangular (D)	3/4 × 7/8	13/32"	1 lb.	Channel on one side	E	2	E42,187	5.25
Rectangular	7/16 × 3/16	1/8"	2.5 oz.	Two Corners beveled	E	100	E41,667	7.75
Disc (G)	1 9/16	9/32"	3 lb. 2 oz.	Two poles on LD	—	2	E40,419	18.25
Cylinder	1/8 dia.	1 5/16"	6 oz.		E	10	E42,828	7.50
Cylinder	5/16 dia.	1" Long	1 lb.		E	10	E31,882	8.25
Cylinder	5/16 dia.	3"	6.4 oz.		—	5	E35,266	3.50
Cylinder (C)	3/8 dia.	5"	14 oz.	Alnico II-good demonstrator	E	2	E60,131	22.50
Cylinder	1/4 dia.	1 3/4" Long	2 lb. 2 oz.	Centerless ground-Alnico V	E	2	E40,418	8.75
Cylinder	3/16 dia.	1"	6 oz.	Centerless ground-Alnico V	—	2	E30,724	4.50
Cylinder	21/32 dia.	9/16"	9 oz.	Small dia. 17/32"	E	8	E42,426	6.15
Cylinder	3/4 dia.	1/2"	8 oz.		LD	2	E36,066	3.50
Ring Gap (A)	1 7/32	7/16"	3 lb.	1/8" gap, 7/16" hole; mag. in gap	—	4	E40,964	5.50
Break-Off (E)	3/8 × 3/8	7/32"	3 oz.		S	12	E42,188	4.75
Break-Off	1/2 × 5/8	3/8"	11 oz.		—	10	E42,304	6.60
18-piece asst.				Excellent for bulletin boards	mixed		E60,581	12.00
Horseshoe	11/16 × 7/8	1 3/8"	7 lb.	1 3/8 × 5/16 Pole Faces	Pole Face	2	E38,703	5.50
Horseshoe (B)	1 × 1	3/16"	1 lb.	3/16 × 1 Pole Faces	Pole Face	2	E36,065	5.00
Horseshoe	1 1/2 × 1 1/2	5/8"	3 lb.	5/8" × 3/8" Pole Faces	Pole Face	2	E34,775	6.75
Disc	3/8" dia.	1/8"	1.5 oz.		LD	10	E38,399	5.25
Cylinder	1 3/16 dia.	1 1/4" Long	2 lb. 8 oz.		E	1	E33,248	6.25
Ring	1/2 dia.	3/16"	3.2 oz.	3/32 Center Hole	LD	10	E33,537	4.50

*Magnetized on: E = End, S = Side, LD = Largest Dimension

STRONG, COMPACT MAGNETS

These strong, permanent type magnets are imported from England and made of Alcomax (similar to Alnico but more efficient). They're perfect for research labs and workshops. Use them for lifting a hot can, or for removing filing chips from holes. Horseshoe or pot type. Red finish, plated keeper.





Wt. (Oz.)	Magnet Size (Inches) (A)	(B)	(C)	(D)	(E)	Pull (lb.)	Avg. Gauss	Comments	Number	Price
1	1 3/32	5/16	1	1/4	7/8	4	1400	Alnico V, Horseshoe	E41,946	$ 10.25
2 1/2	1 5/32	3/4	3/4	9/16	1 3/16	6	1600	Alcomax; U-shaped	E41,947	22.95
5	1 1/2	1	1	3/4	1 1/2	15	2300	Alcomax; U-shaped	E41,948	37.50
8	1 3/4	1 1/8	1 1/8	7/8	1 3/4	25	2600	Alcomax; U-shaped	E41,949	48.50
13	2 1/4	1 3/4	1 3/8	1 3/8	2 1/4	50	3000	Alcomax; U-shaped	E42,338	94.50
25	2 3/4	2 1/4	1 5/8	1 5/8	2 3/4	70	3000	Alcomax; U-shaped	E42,339	139.00
51	3 1/8	3 1/4	2 1/8	1 7/8	3 1/8	100	3000	Alcomax; U-shaped	E42,340	249.00
1 2/3	Ht. 3/4"–Dia.		13/16"			5	1500	Alcomax; pot, tapped	E41,952	15.75

WORLD'S STRONGEST COMPACT MAGNETS: NEODYMIUM-IRON-BORON MAGNETS

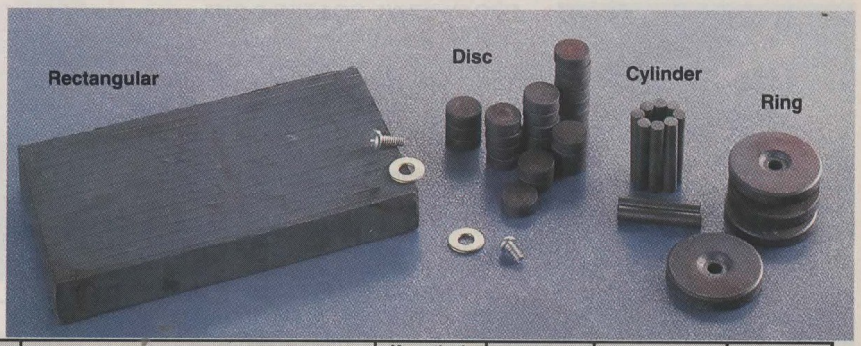
- **Introducing New Sizes & Shapes**
- **Quantity Pricing Available**

Exceed all other commercially available magnets with energy densities of 27 to 35 million gauss oersteds. This is the most compact magnetic material available – reduces size and weight design parameters. They have better mechanical properties than samarium and other rare earth cobalt materials and are more cost effective than other magnets in many cost-sensitive applications. You will find these magnets are suitable almost anywhere permanent magnets are being used.

Size Dimensions	Thickness	Lift	Stock Number	Quantity Pricing 1-5	6-24	25-49	50 or more
3/16" Dia.	1/16"	1¼ lbs.	E38,428	$3.25	$2.85	$2.55	Please
1/4" Dia.	1/8"	1¾ lbs.	E38,429	8.25	7.50	6.75	Call for
3/8" Dia.	1/8"	3.5 lbs.	E35,104	17.50	15.50	13.50	Quotation
15/16" × 9/16"	3/32"	5.5 lbs.	E38,684	23.00	20.50	18.00	
1/2" Dia.	1/8"	5.5 lbs.	E35,105	25.25	22.75	19.75	
1" × 1/8	1/4"	9.5 lbs.	E35,108	31.00	27.75	24.75	
3/4" Dia.	3/16"	11 lbs.	E35,106	38.00	33.00	29.00	
1" Dia.	1/4"	15 lbs.	E35,107	62.00	56.00	50.00	
2" × 2"	1/2"	55 lbs.	E38,430	240.00	216.00	192.00	
1" × 1"	2"	45 lbs.	E38,431	360.00	324.00	288.00	

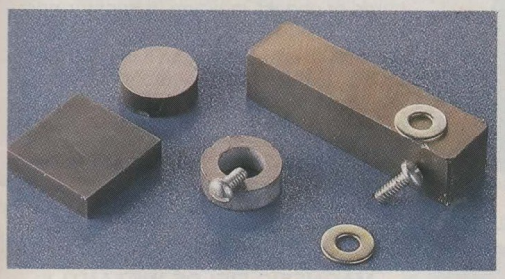
CERAMIC PERMANENT MAGNETS

These ceramic permanent magnets are ferrite based, being made from a combination of iron and other chemicals. Ceramic magnets are extremely resistant to demagnetization, making them useful in a wide variety of industrial and home applications. Most of the magnets in this list are magnetized on the largest dimension(LD). However, some will have a positive and negative pole on the same dimension. This has been noted in the comments.



Shape	Size (inches)	Thickness (inches)	Lb. Lift	Comments	Magnetized On*	Qty.	Number	Price
Disc	3/8	1/8	1 oz.	—	LD	25	E41,986	$ 4.25
Disc	3/8	1/8	1 oz.	—	LD	100	E41,987	11.75
Disc	1/2	1/16	1/2 oz.	—	LD	25	E37,837	3.75
Disc	1/2	1/16	1/2 oz.	—	LD	100	E38,395	11.00
Disc	1/2	3/16	2 oz.	—	LD	25	E40,820	5.75
Disc	1/2	3/16	2 oz.	—	LD	100	E40,819	15.25
Disc	1/2	1/8	2 oz.	—	LD	25	E38,685	4.75
Disc	1/2	1/8	2 oz.	—	LD	100	E38,686	14.00
Disc	1/2	1/4	2 1/2 oz.	—	LD	25	E37,836	4.75
Disc	1/2	1/4	2 1/2 oz.	—	LD	100	E38,394	14.00
Disc	3/4	3/16	2 oz.	—	LD	25	E41,992	6.50
Disc	1	1/4	9 oz.	—	LD	20	E34,078	6.50
Button	1/4 dia.	3/16	1 oz.	—	LD	25	E35,600	2.75
Button	1/4 dia.	1/4	1 oz.	—	E	100	E42,162	6.75
Button	1/4 dia.	1/4	1 oz.	—	E	1000	E42,163	49.25
Cylinder	1/2 dia.	3/4	1 lb.	—	—	20	E36,550	6.25
Cylinder	3/16 dia.	1 1/8 Long	2 oz.	—	—	10	E36,551	4.50
Ring	1/2	1/8	2 oz.	1/4" center hole	LD	25	E41,990	5.00
Ring	1/2	1/8	2 oz.	1/4" center hole	LD	100	E41,991	12.25
Ring	5/8	1/4	4 oz.	1/8" center hole; 2 poles on LD	—	25	E35,556	5.75
Ring	3/4	1/4	4 oz.	1/2" center hole	LD	10	E36,015	4.00
Ring	1 dia.	1/8	2 oz.	3/16" hex center hole	LD	100	E37,496	21.50
Ring	1 dia.	1/8	2 oz.	3/16" hex center hole; 2 poles on LD	—	10	E37,495	4.00
Ring	1 1/8	1/8	6 oz.	3/16" center hole; Rubberized; 2 poles on LD	—	10	E41,988	4.75
Ring	1 1/8	1/8	6 oz.	3/16" center hole; Rubberized	LD	100	E41,989	24.50
Ring	1 1/4	3/16	7 oz.	3/16" center hole; 2 poles on LD and side	—	4	E42,159	4.25
Ring	1 1/4	3/16	7 oz.	3/16" center hole; 2 poles on LD and side	—	25	E42,160	16.25
Ring	1 1/4	1/4	12 oz.	1/2" center hole	LD	10	E35,746	6.25
Ring	1 1/4	3/8	12 oz.	3/16" × 3/8" slot; 2 poles on LD and side	—	4	E42,157	4.50
Ring	1 1/4	3/8	12 oz.	3/16" × 3/8" slot; 2 poles on LD and side	—	25	E42,158	21.75
Ring	1 1/2	3/16	10 oz.	3/16" center hole	LD	4	E40,869	4.75
Ring	1 3/4	1/4	1 lb.	3/4" center hole	LD	10	E38,670	7.50
Ring	1 3/4	1/8	1 lb.	13/16" center hole	LD	4	E31,570	5.50
Ring	2 3/8	1/2	9 lb.	7/8" center hole	—	1	E35,274	5.50
Ring	3 3/8	7/16	6 lb.	1 1/4" center hole	LD	1	E31,589	6.85
Ring	3 7/8	5/16	10 lb.	1 7/8" center hole	—	1	E35,644	5.95
Ring	3 7/8	7/16	9 lb.	—	LD	1	E37,759	6.75
Rectangular	1/4 × 9/16	1/4	2 oz.	—	E	50	E36,063	5.75
Rectangular	3/8 × 3/16	1/8	3 oz.	—	LD	25	E34,533	4.75
Rectangular	1 3/8 × 5/16	1/4	2 oz.	N&S Design	E	10	E42,762	9.50
Rectangular	5/8 × 3/4	3/16	2 oz.	3/16" center hole; Rubberized	LD	25	E31,606	5.75
Rectangular	1 × 1/4	3/16	7 oz.	—	E	25	E38,702	4.75
Rectangular	1 × 1/4	3/16	7 oz.	—	E	100	E38,765	15.00
Rectangular	1 × 3/4	3/16	2 oz.	3/16" center hole	LD	10	E40,637	5.25
Rectangular	1 × 3/4	3/16	2 oz.	3/16" center hole	LD	100	E60,347	25.25
Rectangular	1 × 3/4	3/16	2 oz.	3/16" center hole; with channels	—	10	E41,795	5.00
Rectangular	1 × 3/4	3/16	2 oz.	3/16" center hole; with channels	—	100	E60,944	32.65
Rectangular	1 7/8 × 7/8	3/8	3 lb. 10 oz.	Without pole pieces	LD	2	E41,798	5.25
Rectangular	1 7/8 × 7/8	3/8	3 lb. 10 oz.	Without pole pieces	LD	12	E41,799	18.75
Rectangular	1 7/16 × 3/8	1/8	4 oz.	—	LD	10	E34,508	6.00
Rectangular	6 × 3	1/2	18 lb.	—	LD	1	E38,689	29.00

*Magnetized On: E = End; S = Side; LD = Largest Dimension



RARE EARTH COBALT MAGNETS PROVIDE EXTREME POWER IN A SMALL PACKAGE

These magnets combine the high induction values of Alnico magnets and high coercive force of ceramic magnets. They have an unusually high energy output volume, yet are almost immune to demagnetization. They are highly useful where extreme levels of magnetization are required under strict space and volume constraints. All are magnetized on their largest dimension.

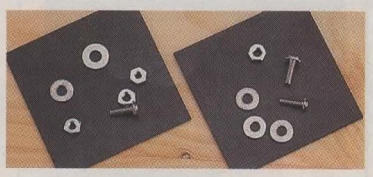
SHAPE	SIZE	GAUSS	OERSTADS	MAX	#/PRICE
Disc	1" dia. 0.375" thick	8200	7300	16.0	E30,963/$66.50
Disc	0.75" dia. 0.25" thick	8200	7300	16.0	E30,962/$44.25
Rectangular	2.25" × 0.55" 0.60" thick	8500	8000	18.0	E30,964/$220.00
Ring	.712" O.D. .375" I.D. .195" thick				E38,709/$36.95
Ring	0.75" O.D. 0.430" I.D. 0.25" thick	8000	7000	16.0	E30,730/$58.00
Square	1" × 1" 0.25" thick	8000	7000	16.0	E30,779/$64.50

FLEXIBLE MAGNETIC STRIP

Mounts easily, pulls just enough to give a good seal, yet permits easy opening and closing. 1400 Gauss. Strip can be cut into smaller utility magnets. Brown only.

Dimensions	Stock Number	Price
7/16" × 0.18" × 12"	E60,092	$3.75
1/2" × 1/16" × 3"	E37,690	$3.15 (Pkg. of 10)
1/2" × 1/16" × 120"	E61,301*	$8.00
1/2" × 1/32" × 120"	E37,497	$5.50

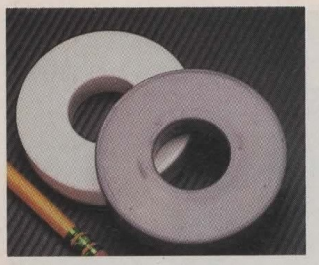
*61,301 is pressure sensitive.



FLEXIBLE MAGNETIC SHEETS

Rubberized magnetic sheets hold small ferrous metal parts during assembly work. Useful in ad signs, craft projects, work table, small parts. 1/32" thick. Material can be easily cut with scissors.

3" × 3". Eight sheets.	E35,732	$7.35
3" × 3". Eight sheets. Self-adhesive back.	E35,734	$9.50
12" × 12". One sheet.	E35,733	$9.25
12" × 12". One sheet. Self-adhesive back.	E35,735	$11.75
6" × 36". One sheet.	E61,011	$15.75



EPOXY/VINYL COATED 2-3/4" DONUT MAGNET

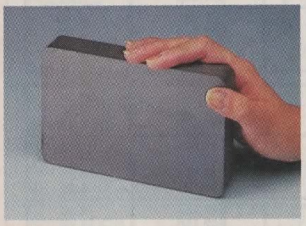
Strontium ferrite ring magnets measure 2-3/4" diameter x 1/2" thick with 1-1/8" diameter center hole. Magnetic strength is 110 gauss at 1.5", lift is 7 lbs. approximately. Protective epoxy/vinyl coating. Slight imperfections since these are manufacturer's seconds at special price. Magnetized on largest dimension.

Magnet E37,621 $6.75

NEW INDUSTRIAL SURPLUS MAGNET

Cermaic ring magnet with 12 pound lift capacity. Mounted in a chrome plated, heavy duty 2" diameter housing. Eyebolt 1/2" dia. 20 threads per inch and has a 1/2" inside dia. eye. Cadmium plated and bolted into the center of the magnet housing. This item makes an ideal temporary non-destructive line mounting or tie a line to the eyebolt and use to pick-up small metal parts, nails etc. from sand, high grass and carpets.

Ring Magnet E39,046 $7.50



FERRIMAG CERAMIC MAGNET

This permanent, oriented, Ferrimag Ceramic Magnet has a high energy output of up to 3.4 megagauss oersteds. Use barium iron oxide magnet for holding devices, loudspeakers, generators. Ground within precise tolerance and meets with MMPA standards. Rectangular magnet measures 6" x 4" x 1". Magnetized on largest dimension.

Ferrimag Magnet E72,540 $53.00

PICK UP AND DISPOSE OF MAGNETIC MATERIALS WITH HANDI-MAG

20-pound-pull magnet has handy instant release handle. Pull of the handle releases the gathered material. 9-1/4" high, 7" wide, 3-1/2" diameter central pistol cylinder. Weighs 1-3/4 pounds. Can be used to align components, retrieve lost objects, clean up metal scatter, even behind corners.

Handi-Mag E34,829 $33.95

35 LB. PULL CERAMIC MAGNET

2-5/8" O.D. in steel case with brass fixed eyelet. Ideal for hanging clip boards, tools, trouble lights, etc. from steel surface cabinets, desks, or machines where disfiguring permanent attachment is not desired.

Ceramic Magnet E42,098 $12.50

LITTLE ALNICO HORSESHOE MAGNETS

Miniature and durable alnico horseshoe magnets 3/8"L x 5/16"W x 5/16" H. Each one lifts approximately 1 oz. Ideal for science projects, miniature motors and bulletin boards. Made of alnico metal. **Package of 10.**

Alnico Magnets E37,515 $4.75

COW MAGNETS

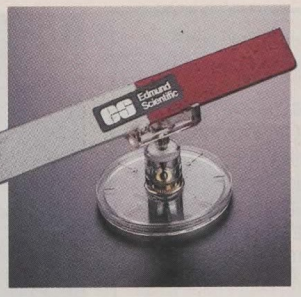
Cow magnets allow farmers to trap metal in the stomachs of their cows. Smooth, cylindrical magnet; rounded edges. Each is 3" L x 1/2" dia. Lift capacity of 3/4 lb. Package of two. Magnetized on the ends.

Cow Magnets E31,101 $14.95

DEMAGNETIZER-MAGNETIZER

Demagnetizes or magnetizes steel tools, taps, drills, screwdrivers etc. Coil opening 1-1/2"H X 3"W. Rigid molded Cycolsac-T housing with momentary on/off switch, 8 ft. cord, 120V/60Hz, 300 watts.

Demagnetizer E36,714 $57.95



INTRODUCTION TO MAGNETIC PRINCIPLES

Two longtime classroom favorites: a student magnet with one pound pull and a one pound container of iron filings. Magnet is 6-1/2" x 3/4" x 1/2" with clearly marked poles. Filings come in a leak-proof container and are excellent for demonstrating magnetic properties. Pkg. of 2 magnets.

Magnets E40,421 $9.50
Iron Filings E60,176 $6.50

Magnet and Swivel Stand. One bar magnet and precision pinpoint pivot rotation stand to demonstrate magnetic principles. Transparent stand. **E38,028 $19.95**

ALNICO SCHOOL GRADE HORSESHOE MAGNETS

Heavy duty all metal alnico magnets are ideal for school demonstrations and industrial applications. Made in England. Each comes with a metal keeper and each has a hole drilled thru the top so that they may be attached to a cord or handle. The "Pull" figure shown can be obtained (or exceeded) on a mild steel smooth test block at least 1/4" thick. On any magnet, the pull drops dramatically as the load gets rougher or thinner. Thus a paint can or an old rusty anchor would be held with much lower force than a good wrench. Best would be an anvil or lathe bed.

Magnet	Keeper	Pull Lbs.	Stock No.	Reg. Price	6-14	15-24	25+
1-3/8"Lx3/4"Hx3/8"T	13/8"Lx3/16"Hx3/8"T	5	E38,170	$8.00	$7.50	$7.00	$6.25
1-5/8"Lx1"Hx1/2"T	1-5/8"Lx3/16"Hx1/2"T	7-1/2	E38,171	$10.00	$9.50	$9.00	$8.50
1-3/4"Lx1-1/8"Hx9/16"T	1-3/4"Lx1/8"Hx9/16"T	15	E38,172	$12.25	$11.75	$11.25	$10.50

MAG-PROBE FOR SENSING MAGNETIC FIELDS

General applications: All voltages (AC & DC), solenoids, solenoid valves, relays, reed relays, coils rotary solenoids, detecting residual magnetism, coils, transient current pulses, identifying north & south poles, etc.

SPECIFICATIONS: Response Time—.01 second, Sensitivity—Standard Model-3 Ampere turns (for trouble shooting miniature & larger solenoids and relays). High Sensitivity—1 Ampere turn (for trouble shooting sub-miniature & smaller solenoids, relays and reed relays). Operating Frequency—DC to 400 Hz. Shelf Life—Retains 90% of its operating capacity after 3 years. Operating Life—5,000 five second tests. Salt & Moisture Proof—MIL STD.—202, Thermal Shock—MIL STD.—202. No calibration required.

A. Standards Sensitivity Model: For testing the largest to standard sized solenoids and relays, suitable for automotive applications, including alternators and voltage regulator tests. **E36,912 $44.95**

B. High Sensitivity Model: Most sensitive model. For testing the largest to sub-miniature solenoids, relays and most reed relays and all automotive applications. **E36,913 $52.95**

MAGNA VIEW FILM

Mylar film reads magnetic fields on credit cards or checks leakage in transformers, circuit devices. Waterproof, tear resistant, reusable, flexible. 4" x 4" sheet. 0.006" thick. Film has intergraded designed encapsulated chambers containing dry ferrous magnetic material. (Magnet is not included).

Magna View Film E33,447 $10.75

MAGNAPROBE TRACES MAGNETIC FIELDS INSTANTLY

Demonstrates a magnetic field's 3-D nature. Unit has a tiny, sensitive, color-coded bar magnet which pivots on a rotatable bearing mounted on three axes. 4" x 1" x 1-1/2". Carrying pouch.

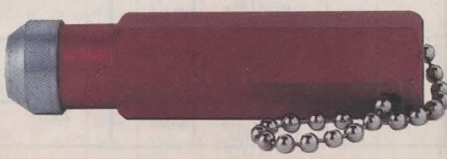
Magnaprobe E42,217 $24.95

KEY CHAIN POCKET MAGNET

We mounted a strong 7-pound-pull magnet in a plastic handle. The result was a very handy tool that you might want to carry with you everywhere...so we added the key chain. Many uses: magnetize small tools, check metal type, pick up small parts, hang keys on refrigerator door, magic tricks, more.

Pocket Magnet
E36,329 $5.95
3-9 Magnets $5.25 each
10 & Up $4.85 each

For orders of 200 or more, you may have these magnets personalized (one line) at no extra charge. **$4.25 each**



EDMUND SCIENTIFIC'S MIGHTY MAGNET LIFTS UP TO 200 POUNDS

- **Edmund Designed & Engineered**
- **Large Gripping Surface - 3-1/4" Square**
- **Extra Strong Handle, No Sharp Edges**
- **Coated for Protection from Chemicals**

Go treasure hunting on the bottom of a bay, river, lake or ocean. Tie a line to this powerful lightweight magnet and drop it over the side. Your treasure haul can be anchors, fishing tackle - all kinds of ferrous metal valuables. Ecologists even use them to clear junk from streams. Many industrial and maintenance uses - pick up nails, scrap metal, nuts and bolts from driveways, parking lots, garages and workshops; retreive tools from dip and coolant tanks; group several on rods for conveyor belt sweeping and more. Oil well drillers even use them to retrieve broken drill heads! This Edmund exclusive has 6 strong ceramic magnets stacked for strength with steel pole pieces, an aluminum frame and bar handle for easy carrying. Everything but the large 3-1/4" square gripping surface is covered with 1/8" thick, special heat-fused PolyVinyl Chloride that protects the magnet from corrosion by chemicals, acids, alkalis, plating solutions and some organic solvents. Bright orange PVC coating (easily spotted underwater) is smooth, seamless and resilient. Won't chip, peel or harden. Especially good on flat ferrous metal objects, its multiple uses make it pay for itself many times over.

Edmund Mighty Magnet **E71,135 $32.95**

EDMUND SCIENTIFIC ELECTROMAGNETS

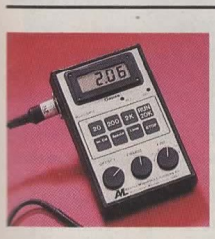
Electromagnets develop a magnetic field and thus lift when electric current passes through the wound coil. Accordingly, you control the magnetic action by turning the current on/off.

A) 500 Pound Lift Magnet. Small but strong. Only 3" diameter X 7-1/2" long overall. Weighs three pounds. Cold-rolled steel body contains wire coil. Operates on 2"D" batteries (not included). Alligator clip used to complete circuit is included, or you can wire to your on/off switch. Mounted battery holder. Two 1/4" -20 eyebolts. One attaches to your lift winch. Object to be pulled or lifted is hooked to other eyebolt mounted in face plate. When magnet body and face plate are in contact with each other, complete the circuit with alligator clip and lift.

500 Pound Electromagnet **E71,936 $82.95**

B) 200 Pound Lift Electromagnet. Same general characteristics as magnet listed above. Operates on one "C" battery (not included). 4-1/4" Lx2-1/2" dia. Weighs two pounds.

200 Pound Electromagnet **E60,435 $52.95**



METER TO MEASURE MAGNETISM

Portable micropower gaussmeter is accurate within 0.25% 61 digit for all ranges. Precalibrated probes eliminate the need for reference magnets. Only gaussmeter on market with touch keyboard controls. Liquid crystal display. Automatic polarity indicator. Range from 20.00 to 19.99 kilogauss. Will measure small variations in large (4KG) fields using OFFSET controls. Handles low field measurements, flux mapping, magnet inspection, ambient field surveys. One 9V battery (included) will operate unit for approximately 100 hours. Probes sold separately.

Gaussmeter **E33,445 $440.00**

Transverse Probe. Blade-type for gap measurements. Wire lead 36" long. Blade tip 2"L x 3/8"W x 1/16" Thick. **E33,446 $92.00**

Axial Probe. End sensing for surface measurements. Wire lead 32" long. Rubber covered probe 2" L x 3/8" Diameter. **E34,204 $92.00**

Magnetometer Probe. For flux mapping to two gauss. Wire lead 31" long. Probe 9"L x 1/2" W x 1/4" Thick. **E34,205 $279.00**

NOTES ON MAGNETIC PULL

The pound lift or pull figures for magnets in this catalog have been obtained by using an iron test block 1/4" thick with a clean, flat surface. Magnetic lift is dramatically reduced by surface dirt, rust, paint and thin metal. Metals with low ferrous content and/or irregular shape, such as round bars, will also affect a magnet's performance.

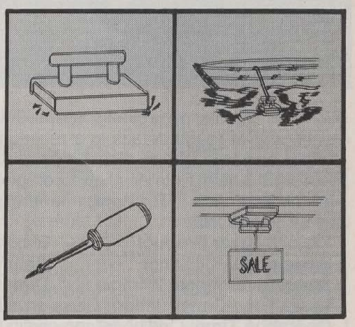
Ordering Information • Please order by Item Number and number of packages desired

EDMUND SCIENTIFIC 25 POUND PULL CHANNEL MAGNET WITH HANDLE

Powerful, pocket-size magnet with convenient handle is ideal for a variety of uses, from holding up display charts to industrial applications. 1-3/4" L ceramic magnet is bonded inside a metal channel with plastic handle.

2-3/4"L x 1-1/8"W x 1-1/2" H.

Magnet **E40,847 $5.75**



95-POUND-LIFT MAGNET

Two permanent ceramic magnets mounted in rust-resistant plated steel housing. Handle has loop to center retrieval line. Handle is 1"H.

Size: 4-1/2"L x 5/8"W x 1"H

Weight: 12 oz.

Magnet **E42,095 $14.95**

150 POUND-LIFT MAGNET WITH LEVER RELEASE

Four permanent ceramic magnets mounted in rust-resistant plated steel housing. Stainless steel handle and easy-release bale. Fixed eyelet for mounting retrieval line.

Size: 4-1/2" L x 1-1/4" W x 1-3/4" H

Eyelet: 1-3/8" High

Weight: 1 lb. 4 oz.

Magnet **E42,447 $28.95**

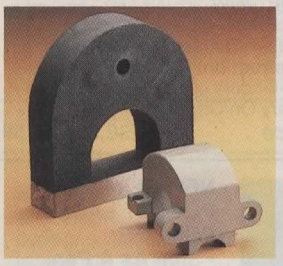
SURPLUS CERAMIC RING MAGNETS

A. Ring Magnet With 9 Pound Pull. 2-3/8" diameter. 1/2" thick. 7/8" center hole. **E35,274 $5.75**

B. Ceramic Ring Magnet. 3-3/8" diameter. 7/16"thick. 1-1/4" center hole. Pulls 6 lbs. Uncoated. **E31,589 $6.85**

C. Ring Magnet With 10 Pound Pull. Ceramic magnet has 3-7/8" diameter. 5/16" thick. 1-7/8" center hole. Not shown. **E35,644 $6.25**

**Blue magnet pictured is not available.*



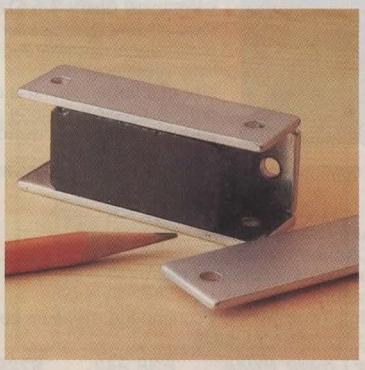
CHECK THE LIFT POWER OF OUR GIANT ALNICO HORSESHOE MAGNETS

Useful in separating ferrous from non-ferrous material, as a powerful vise, tool retriever, stream fishing for metal treasure and more.

A) 155 Pound Industrial Magnet. Twin 1-1/4" gripping surfaces with keepers. 1/4" hole in body for tie line. 5" x 4-1/2" x 1-1/4". Made to order for industrial use. **E31,105 $159.00**

B) 25 Pound Lift Alnico. Twin 5/9" x 1-1/4" gripping surfaces. 2-1/2" high. Aluminum, nickel, iron and cobalt blend. **E60,215 $17.95**

C) Surplus Magnet With 15 Pound Lift. 4-7/8" x 1-1/4". Used. **E34,882 $10.95**



CERAMIC MAGNETS WITH POLE PIECES FOR INCREASED HOLDING POWER

Ceramic magnets (1-7/8" x 7/8" x 3/8") lift 3 lbs. each. Add the pole pieces and each will lift 40 lbs. Unlike most bar magnets whose poles are located at the smaller ends, these magnets have poles spread over the largest sides. The holding force may be greatly increased by a relocation of the poles using steel plates (pole pieces), which moves the north and south poles closer together. Pole pieces have 3/8" holes at each end for permanent assembly or to attach a handle or cord. 2 magnets; 4 pole pieces.

Package of 2 **E40,818 $8.75**

Package of 12 **E60,528 $28.00**

LASEREX LASER POINTER: "The Light Fantastic"

Wherever you have an audience, the Laserex Laser Pointer enables you to command attention. From conferences to sales meetings, the Laserex Laser Pointer will efficiently highlight your point and enchance your presentation with a sense of style. New generation handheld laser projects a brilliant red laser spot in daylight or darkness onto objects, projection screens, TV monitors, X-rays and charts, and will even point out and identify out-of-reach details in a museum or art gallery. Because the laser beam is remarkably straight and true, it can also be used for a variety of alignment purposes. The new mini-size lightweight Laser Pointer allows complete freedom of movement and is supplied with a luxury leather carry case. **Brilliant:** Generally useful for up to 50 M (55 yards).

SPECIFICATIONS:

Class II Laser Product | **Maximum Output:** 1.0mW | **Self-Contained:** yes
Wavelength: 632.8nm | **Beam Diameter:** 0.34 mm | **Polarization:** Random
Beam Divergence: 2.4mrad | **Dimensions:** 6" Lx2-1/2" Hx1-3/8" T | **Weight:** 8 oz.
Laser Tube Construction: Glass-envelope
Operating Time: One hour (non-continuous)
Power Requirements: Two 9V batteries/or AC adapter from 115V outlet **Switch:** Momentary On/Off

Laserex™ Laser Pointer *New Low Price* **E37,532 $279.00**

A LASER THE SIZE OF A FLASHLIGHT

Handheld laser pointer ideal for audio-visual presentations, planetariums and lecture halls. Brilliant red spot is visible even in well lit rooms. Does not require focusing like ordinary pointers. Rectangular housing with contoured edges. Useful as general purpose laser in laboratory, research and educational applications. Helium-neon tube.

SPECIFICATIONS:

Class II Laser Product | **Power Output:** 0.5mW-.7mW
Wavelength: 632.8nm | **Beam Diameter:** 0.48 mm
Beam Divergence: 1.7mrad | **Polarization:** Random
Weight: 12 oz | **Dimensions:** 6"Lx1-5/16"Wx1-7/8"H
Laser Tube Construction: Steel Ceramic
Power Requirements: 115V AC or three 9V batteries
Operating Time: Approximate 1 hour non-continuous battery use.

Laser Pointer **E35,712 $249.00**

Battery Pack for laser features leather case. 3-1/4" wide x 3-7/8" high x 1-11/16" thick, with belt loop and 5' long cord. Power supply is three 9 volt alkaline batteries (not included). Battery service life approximately one hour of non-continuous use. **E35,786 $49.00**

Laser Diode Laser Pointers — Simulated Beams

LASER DIODE LASER POINTER

- **Brilliant Red Spot Visible Up To 150 Feet**
- **Only 6 Inches L x 1/2" Diameter**
- **Weighs Only 3 Ounces**

Premier quality from medical laser manufacturer, Laserex, this pointer features solid-state electronics, quality coated optics and a zinc-alloy chassis. Lasts approximately 7 hours on one set of batteries, flexible design allows you to power unit with either 2 "AAA" or 3 N-Cell batteries (not included).

SPECIFICATIONS:

Class II Laser Product | **Maximum Output:** Less than 1.0mW | **Wavelength:** 670nm (±10)
Beam Diameter: 4mm (±2mm) | **Polarization:** Random | **Switch:** Momentary On/Off
Laser Tube Construction: Diode | **Power Requirements:** 2 "AAA" or 3 N-Cells
Operating Time: +7 hours continuous | **Dimensions:** 6"L x 1/2" Diameter
Weight: 3 Ounces | **Beam Divergence:** Less than 1m Rad

Diode Laser Pointer **E39,472 $199.00**

4 OUNCE LASER POINTER

Lightweight and compact laser pointer weighs only 4 oz. and measures 6" long x 3/4" diameter. Utilizing laser diode technology, this new pointer provides both size and long battery life advantages. Powered by 2 "AAA" batteries (not included), it will run for 6 hours continuous. Can be seen at over 150 feet in normal room light.

SPECIFICATIONS:

Weight: 4 oz.
Class II Laser Product | **Maximum Output:** .9mW
Wavelength: 670nm; | **Beam Diameter:** 6 mm
Beam Divergence: 0.5mrad | **Dimensions:** 6" x3/4" Diameter
Polarization: Random | **Laser Tube Construction:** Laser Diode
Power Requirements: 2 "AAA" Batteries | **Operating Time:** 6 hours continuous
Switch: Momentary On/Off

Mini-Tracer Laser Pointer *New Lower Price* **E38,586 $259.00**

NEW SLIMLINE POCKET LASER POINTER

- **Slim As A Pen, Only 5/8" Diameter**
- **Weighs Only 3.5 Ozs.**

New slimline laser pointer is a dimensional breakthrough in laser pointers. Roughly the size of a large pen, it is only 5/8" diameter x 5" long and weighs only 3.5 ounces.

Features a pocket clip and 2 activating switches, one for continuous mode and one for the pulsing mode (red dot flashes rapidly).

SPECIFICATIONS:

Class II Laser Product | **Maximum Output:** 0.9mW
Wavelength: 670nm | **Beam Diameter:** 6mm
Beam Divergence: 0.5mrad | **Dimensions:** 5" long x 5/8" dia.
Weight: 3.5 Ozs. | **Polarization:** Random
Laser Tube Construction: Laser Diode | **Operating Time:** 8 hours continuous, 16 hours pulsed
Power Requirements: 2 "AAA"Batteries | **Switch:** Momentary On/Off

Pocket Laser Pointer *New Lower Price* **E38,942 $229.00**

OUR SMALLEST AND BRIGHTEST LASER POINTER

- **5mW Maximum Output. . . 4-7/8" Long**
- **Technological Breakthrough. . . 5/8" Diameter**

The brightest beam of any compact laser pointer at a price breakthrough. The Applied Laser System's Laser Pointer is a revolution in pointer design and affordability. Only 4-7/8" long, 5/8" in diameter and weighing just 2 ounces with battery, this pointer sets the standard for the industry. Add to this the convenience of its use (it clips onto your shirt pocket like a pen) and you have a product perfect for lectures, educators and other professionals. Battery life is over ten hours with continuous use. Aluminum body is available in red or black. With gold pen clip.

Class IIIa Laser Product
Maximum output: 5mw | **Beam Diameter:** 4mm x 0.6mm
Wavelength: 670nm | **Polarization:** Random
Laser Type: Index Guided Diode | **Switch:** Momentary On/Off
Weight: 2.4 oz. (includes battery) | **Dimensions:** 4-1/8" L x 11/16" Dia.
Beam Divergence: 1.0mrad (typical)
Power Requirement: 4.5VDC 3 - "N" Cells
Operating Time: 10 continuous hours

Black Body Laser Pointer **E38,914 $199.00**
Red Body Laser Pointer **E39,074 $199.00**

SOLID-STATE POCKET LASER POINTER

- **Weighs only 5 Ounces**
- **Visible up to 150 feet away**

Our new solid-state semiconductor diode laser utilizes the new laser technology developed for compact disc players. Combined with precision optics and housed in a compact high-tech anodized aluminum body, this new laser is ideal as a laser pointer or a laboratory instrument. Powered by 2 "AAA" batteries (not included), it will run up to 7 hours average use; 2 hours continuous use. It projects a brilliant red point of light visible up to 150 feet away. Comes with a luxury leather case and fits neatly into your pocket. Made in Switzerland.

SPECIFICATIONS:

Class II Laser Product;
Output: 0.5...1mW | **Polarization:** Random
Beam Divergence: 0.7mrad | **Beam Diameter:** 4mm
Dimensions: 5.7" L x 1.3" H x .6" W | **Weight:** 5 ounce;
Power Requirements: 2 "AAA" Batteries | **Wavelength:** 670nm
Operating Time: 2 hours continuous | **Switch:** Momentary On/Off
Laser Tube Construction: Solid-State Diode

Pocket Laser Pointer **E38,680 $369.00**

UNIPHASE HELIUM-NEON LASERS

Improved thermal stability is combined with the smallest possible tube size, allowing greater design flexibility and enhanced laboratory usefulness. All lasers available in 110V or 220V. Rectangular (Rect.); Cylindrical (Cyl.).

Features include:

- **Hard sealed internal mirrors for extended life**
- **± 2.5% power stability**
- **Low noise operation (1.0% RMS noise)**
- **± 10 microradian pointing stability**
- **99% TEMoo mode purity**

110V Item #	220V Item #	Min. Output	Beam Dia.	Beam Divergence	Polarization	Size (mm)	Weight	Shape	Type	Class	Price
E34,891	E61,382	0.5mW	0.48 mm	1.7mrad	Random	63 × 51 × 184	1.12 lbs.	Rect.	Self-contained	II*	$215.00
E61,315	E61,360	0.5mW	0.48 mm	1.7mrad	Linear (500:1)	63 × 51 × 184	1.12 lbs.	Rect.	Self-contained	II*	$250.00
E61,316	E61,361	0.5mW	0.48 mm	1.7mrad	Random	37 dia. × 178 (H)	3.5 lbs.	Eyl.	Remote PS	II	$530.00
E61,317	E61,362	0.5mW	0.48 mm	1.7mrad	Linear (500:1)	37 dia. × 178 (H)	3.5 lbs.	Cyl.	Remote PS	II	$590.00
E61,318	E61,363	0.8mW	0.48 mm	1.7mrad	Random	37 dia. × 178 (H)	3.5 lbs.	Cyl.	Remote PS	IIIb	$600.00
E61,319	E61,364	0.8mW	0.48 mm	1.7mrad	Linear (500:1)	37 dia. × 178 (H)	3.5 lbs.	Cyl.	Remote PS	IIIb	$665.00
E61,320	E61,365	1.0mW	0.63 mm	1.3mrad	Random	31.6 dia. × 241 (H)	3.6 lbs.	Cyl.	Remote PS	IIIb	$565.00
E61,321	E61,366	1.0mW	0.63 mm	1.3mrad	Linear (500:1)	31.6 dia. × 241 (H)	3.6 lbs.	Cyl.	Remote PS	IIIb	$620.00
E61,337	E61,373	1.0mW	0.48 mm	1.7mrad	Random	63 × 51 × 184	1.12 lbs.	Rect.	Self-contained	IIIb	$280.00
E61,338	E61,374	1.0mW	0.48 mm	1.7mrad	Linear (500:1)	63 × 51 × 184	1.12 lbs.	Rect.	Self-contained	IIIb	$320.00
E61,322	E61,367	2.0mW	0.63 mm	1.3mrad	Random	31.6 dia. × 241 (H)	3.6 lbs.	Cyl.	Remote PS	IIIb	$630.00
E61,323	E61,368	1.8mW	0.63 mm	1.3mrad	Linear (500:1)	31.6 dia. × 241 (H)	3.6 lbs.	Cyl.	Remote PS	IIIb	$690.00
E61,324	E61,369	4.0mW	0.81 mm	1.0mrad	Random	37.97 dia. × 386 (H)	4 lbs.	Cyl.	Remote PS	IIIb	$650.00
E61,325	E61,370	4.0mW	0.81 mm	1.0mrad	Linear (500:1)	37.97 dia. × 386 (H)	4 lbs.	Cyl.	Remote PS	IIIb	$710.00
E61,326	E61,371	5.0mW	0.81 mm	1.0mrad	Random	37.97 dia. × 386 (H)	4 lbs.	Cyl.	Remote PS	IIIb	$760.00
E61,327	E61,372	5.0mW	0.81 mm	1.0mrad	Linear (500:1)	37.97 dia. × 386 (H)	4 lbs.	Cyl.	Remote PS	IIIb	$830.00

Notes: Power Supply for lasers E61,316 through E61,327 is 159 × 205 × 64 mm in size. Power supply for lasers E61,328 and E61,329 is 317.5 × 127 × 101.6 mm.
*E34,891 & E61,315 - 1.0% RMS Noise.

UNIPHASE HELIUM-NEON LASERS

Superb quality instruments are designed to provide years of dependable performance. Each has excellent warm-up characteristics, precise beam, alignment and stable output power. Virtually maintenance-free. Proven in the lab as precision tools. Each emits a red light of 632.8nm wavelength. Lasers available in 110V or 220V.

Features include:

- **Hard sealed plasma tube**
- **Typical lifetime exceeding 22,000 hours**
- **Low amplitude noise**
- **Consistent level of power output over laser life**
- **Outstanding beam pointing performance**

110V Item #	220V Item #	Min. Output	Beam Dia.	Beam Divergence	Polarization	Size (mm)	Weight	Shape	Type	Class	Price
E79,092	E79,108	0.5mW	0.88 mm	1.0mrad	Random	67 × 88 × 376	4 lbs.	Rectangular	Self-contained	II	$ 360.00
E61,339*	E61,375	0.5mW	0.88 mm	1.0mrad	Random	67 × 88 × 376	4 lbs.	Rectangular	Self-contained	II	$ 390.00
E61,330	E61,376	1.5mW	0.49 mm	1.6mrad	Linear (500:1)	34.9 dia × 279.4 (H) 133 × 129 × 61 (PS)	1 lb. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$ 765.00
E61,331	E61,377	2.0mW	0.49 mm	1.6mrad	Random	34.9 dia × 279.4 (H) 133 × 129 × 61 (PS)	1 lb. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$ 725.00
E61,332	E61,378	5.0mW	0.83 mm	1.0mrad	Linear (500:1)	44.2 dia × 405 (H) 133 × 129 × 61 (PS)	1.94 lbs. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$ 830.00
E61,333	E61,379	5.0mW	0.83 mm	1.0mrad	Random	44.2 dia × 405 (H) 133 × 129 × 61	1.94 lbs. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$ 760.00
E61,334	E61,380	10.0mW	0.68 mm	1.2mrad	Linear (500:1)	44.2 dia × 485 (H) 203 × 70 × 35.5 (PS)	2.2 lbs. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$1,350.00
E61,335	E61,381	10.0mW	0.68 mm	1.2mrad	Random	44.2 dia × 485 (H) 203 × 70 × 35.5	2.2 lbs. 2.2 lbs.	Cylindrical	Remote PS	IIIb	$1,160.00

*Equipped with 1-32 threaded mounting bezel for Edmund 10X Beam Expander and other accessories.

METROLOGIC HELIUM-NEON LASERS

Metrologic, one of the pioneers in offering affordable lasers for high school and colleges, presents its line of hard-seal practical tools for education and industry. All lasers are 110V.

- **Rugged aluminum housing**
- **Built-in threaded optics mount**
- **Designed to operate in temperatures −20° to 50°C**
- **Components are designed, engineered and manufactured in one central plant for flexibility and quality control**

Item	Minimum Output	Beam Diameter	Beam Divergence	Polarization	Size (mm)	Weight	Shape	Type	Class	Price
E61,308	0.5mW	0.53 mm	1.5mrad	Random	239 × 72 × 74	4 lbs.	Rectangular	Self-contained	II	$339.00
E33,420	0.8mW	0.53 mm	1.5mrad	Random	239 × 72 × 74	4 lbs.	Rectangular	Self-contained	II	$389.00
E61,309	0.8mW	0.53 mm	1.5mrad	Random	175 × 135 × 60	5 lbs.	Cylindrical	Remote PS	II	$569.00
E61,310*	0.8mW	0.53 mm	1.5mrad	Random	328 × 72 × 74	6 lbs.	Rectangular	Self-contained	II	$489.00
E61,311*	1.5mW	0.53 mm	1.5mrad	Random	328 × 72 × 74	6 lbs.	Rectangular	Self-contained	IIIb	$529.00
E61,312	2.0mW	0.68 mm	1.2mrad	Random	328 × 72 × 74	6 lbs.	Rectangular	Self-contained	IIIb	$499.00
E61,313	3.5mW	0.68 mm	1.2mrad	Random	328 × 72 × 74	6 lbs.	Rectangular	Self-contained	IIIb	$599.00
E61,314	5.0mW	0.68 mm	1.2mrad	Random	540 × 72 × 74	6 lbs.	Rectangular	Self-contained	IIIb	$799.00

*Modulated lasers.

LASER POWER METERS

A) Photometer
Measures beam intensity on calibrated meter in 8 ranges from 0.003 to 10mW. Meter is calibrated for direct reading of 633nm wavelength of helium-neon light. DC to 20kHz frequency response. Accurate within 10% for each sensitivity range. Features: detachable detector head for mounting on ringstand or optics bench, and banana jacks for connecting to chart recorders, microcomputers and projectors. Battery powered (two 9 volt, not included) for portability.

Photometer **E34,516 $159.00**

B) Digital Power Meter
Designed for accurate CDRH compliance measurements. LCD digital readout of 4 ranges. (19.99µW, 199.9µW, 1.999mW, 19.99mW). Certified within 2% for 633nm, 10% for other wavelengths.Measures 2.4" x 5.4" x 7". Features: detachable detector head for mounting on optical bench, coax connector on front panel for rapid attachment to chart recorders and oscilloscopes and battery test. Battery powered (9volt, not included) for portability. Calibration charts and instructions included. Calibrated for 632.8nm.

Power Meter **E34,515 $399.00**

BUILD-A-LASER KIT

The assembled laser is ideal for student laboratory and classroom demonstrations. Kit contains all the necessary components required to assemble the 0.5mW helium-neon laser including 20,000 hour continuous-use hard sealed laser tube, heavy-duty aluminum case, beam shutter, fused 110V. AC power cord with grounded three prong molded plug. Solid state printed circuit board, electronic components and complete mounting hardware. 25 page instruction book includes diagrams and schematics. Student assembly in less than three hours.

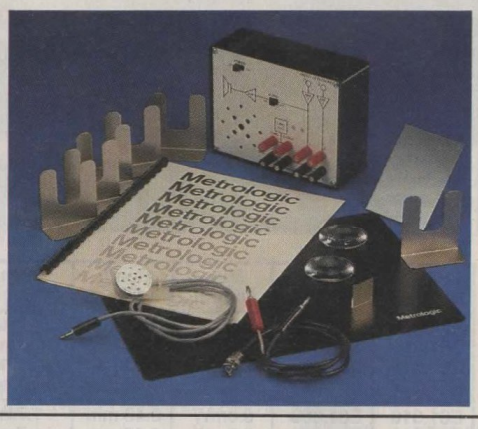
Laser Kit **E38,207 $249.00**

TECHNICAL INFORMATION
If you require additional information not stated in our catalog, dial:
1-609-573-6253 1-609-573-6259
9AM to 5PM Eastern Time, Mon. -Fri.

LASER VIDEO/SPEED OF LIGHT LAB

Laser Video Lab not only gives you that answer, within 1 percent, but can receive the light from a distant audio-modulated laser, detect and amplify it, and will reproduce voice communication and music or furnish an output for a video monitor to reproduce pictures. Experimenter's kit includes an electronic control box which has a 1MHz oscillator and dual channel photo-detector amplifier, beam splitter, high impedance microphone, detailed instruction manual and more. Comes packed in a rugged carrying case. Required for operation but not included are a modulated laser, video camera and dual channel oscilloscope. Lab weighs three pounds.

Laser Video/Speed Of Light Lab **E35,773 $175.00**
Recommended Modulated 0.8mW Laser
E61,310 $489.00



LASER OPTICS LAB

Optics Lab lets you investigate the principles of optics, including refraction, reflection and critical angle. Lab includes three lenses, four mirrors, coated beam splitter, beam spreader, triangular prism, air wedge, fiber optics light guide, a pair of glass interference plates and polarizing and color filter sets. Also includes an optics platform, razor blades, magnetic tape and a metric ruler. Optics platform uses six metal component carriers which attach magnetically to a steel optical table. Components come in a reusable carrying case. Set includes the 64-page instructional manual,"Laser Optic Experiments Using A Helium-Neon Laser." Book provides detailed instructions on laser safety and operation, an explanation of laser theory and a thorough list of experimental exercises. Provides the basic optical and mechanical components for optics studies for elementary and high school students. Weighs about six pounds. Kit does not include laser.

Laser Optics Lab **E34,511 $149.00**
Recommended 0.8mW Laser **E33,420 $389.00**

SANDBOX HOLOGRAPHY LAB

Lab kit allows you to make "white light" holograms which can be viewed without a laser, create 360 degree holograms, expose film and more. Sandbox set includes two diverging lenses on carriers, two front surface mirrors with carriers, beam splitter with carrier, film holder (two glass plates and two clamps), 24 sheets of film, 360 degree hologram set (mirror, jar pedestal and subject), two beam test and shutter cards, safelight filter, hologram, diffuser for soft light holograms and the book,"Holography Using a Helium-Neon Laser." The set is packed in a reusable carrying case. The book, written by Dr. T.H. Jeong, offers progressive exercises which build from preliminary tests through basic holograms. Additional exercises include holographic applications and advanced forms such as multiple subject illumination and soft lighting. Shipping weight is about six pounds. Kit does not include laser.

Sandbox Holography Lab **E34,512 $149.00**
Recommended 5mW Laser **E61,314 $799.00**

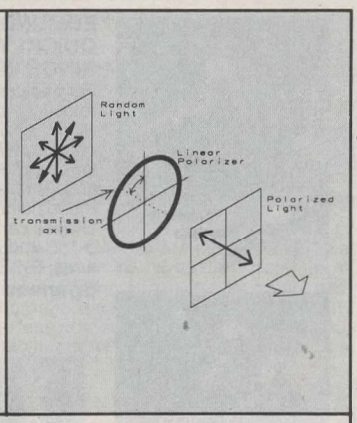
PHYSICAL OPTICS LAB

Use this Physical Lab to create a two-hour introductory lesson filled with rapid-fire demonstrations. See the results of optical transformation. Witness Fresnel and Fraunhofer diffraction. Dissect a diffraction pattern using masks. Create a continuous tone photograph from a halftone. Retrieve two photographs from a single transparency. Filter unwanted data from a photograph. Change spatial frequency. Students need no math preparation to understand the phenomena occurring before their eyes. Lab serves as an ideal introduction to the mathematics of transformations and Fourier analysis. Lab kit includes three mounted lenses, two mounted front surface mirrors, eight steel "L" mounts, eight steel "U" mounts, a 615mm focal length lens, a mylar viewing screen, 24 transparencies and magnetic strips. All items are fitted in a reusable carrying case. Comes with a complete instruction book."Physical Optics Experiments Using A Helium-Neon Laser." Book provides information on diffraction, photography and Fourier math. Weighs about six pounds. Kit does not include laser.

Physical Optics Lab **E34,513 $149.00**
Recommended 2mW Laser **E61,312 $499.00**

POLARIZED LIGHT

Ordinary light consists of electric and magnetic waves at right angles to one another eminating in all possible planes relative to the source. The polarization at this point is considered random and has no preferred direction. If a piece of polarizing material is now inserted the planes in which the electromagnetic waves travel can be controlled such that only a single plane exists. This is clearly shown when two polarizers are used in conjunction with one another. If the transmission axes (polarized planes) are parallel, the light will be transmitted. If they are perpendicular, no light will pass. By varying the angle between the transmission axes it is possible to control the intensity of the transmitted light. This is the same principle used in variable density filters.



BROAD APPLICATION POLARIZERS

Intended for use in eyeglasses, airplane cockpit windshields, and many optical uses, this sheet polarizing material is ideal for experimenting, photography, microscopy, unique lighting effects, advertising displays, teaching and more.

Commercial Grade

Only 0.030″ thick and can be easily cut. Transmission: 23-25%; polarizing efficiency over 99%. Resistant to fading and delamination. Peel-off protective film. First quality, continuing supply guaranteed.

Size (Inches)	Color	No. Sheets	Stock Number	Price
14 × 24″	Gray	1	E71,939	$32.75
14 × 24″	Gray	2	E71,940	59.00
14 × 24″	Brown	1	E71,942	32.75
14 × 24″	Brown	2	E71,943	59.00
7 × 24″	Gray	1	E38,491	$17.50
7 × 24″	Gray	2	E38,492	33.25
7 × 24″	Brown	1	E70,887	17.50
7 × 24″	Brown	2	E70,888	33.25
12 × 14″	Gray	1	E38,493	$17.50
12 × 14″	Gray	2	E38,494	33.25
12 × 14″	Brown	1	E38,495	17.50
12 × 14″	Brown	2	E38,496	33.25
6″ Dia.	Gray	2	E60,638	$17.25
3¼″ Dia.	Gray	2	E40,990	14.00
6″ Dia.	Brown	2	E38,497	17.25
3¼″ Dia.	Brown	2	E38,498	14.00
2 × 2″	Gray	20	E41,168	$12.50
2 × 2″	Brown	20	E38,499	12.50

EXPERIMENTAL GRADE

Industrial surplus material may have minor imperfections but is optically good and ideal for experimenting. 38% transmission; polarizing efficiency 25% parallel, .5% crossed; neutral color. Peel-off protective film.

Size	Thickness	Color	No. Sheets	Number	Price
2½″ Dia.	—	Brown & Gray	20	E38,396	$12.50
7″ × 7″	0.015″	Gray	1	E37,348	8.50
7″ × 7½″	0.015″	Gray	1	E37,349	8.50
7½″ × 7½″	0.010″	Gray	1	E37,350	8.50

GLASS POLARIZING FILTERS IN STANDARD PHOTO MOUNTS

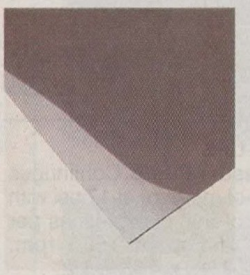
Optical grade glass polarizing filters come in standard threaded photographic filter mounts. Two may be screwed together to achieve variable-density effect.

Mount Dia./mm	46	49	52	55	58	62
Stock #	E36,439	E36,440	E36,441	E36,442	E36,443	E36,444
Price (Each)	$14.95	$14.95	$15.95	$16.95	$17.95	$19.95

LARGE POLARIZING FILM SHEETS IN ASSORTED FILTER COLORS

Optical grade film sheets are flexible. Light transmission and polarizing co-efficiency varies with color.

Stock #	Dimensions	Filter Color	Thickness	Price	Transmission Percentage
E36,445	500 × 500mm	Red	0.18mm	$54.75	59%
E36,446	500 × 500mm	Yellow	0.18mm	$54.75	59%
E36,447	500 × 500mm	Blue	0.18mm	$54.75	56%
E36,448	500 × 500mm	Orange	0.18mm	$54.75	56%
E36,449	500 × 500mm	Green	0.18mm	$54.75	56.5%
E36,940	500 × 500mm	Smoke	0.18mm	$54.75	56.5%
E36,451	500 × 500mm	Purple	0.18mm	$54.75	48.5%

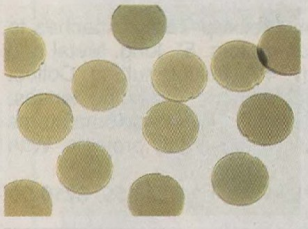


MIRRORED POLARIZING SHEET—6″ × 24″

Mirrored (partially aluminized) polarizing material in large 6″ × 24″ sheets with peel-off protective film. This material is similar to that used in mirrored sunglasses. The effect is like a one way mirror—the viewer sees through the material while someone looking at the material sees only a mirror image.

Specifications:
Grade: commercial, 6″ × 24″. **Transmission:** 23-25%. **Efficiency:** 99.5%. **Thickness:** 0.027″. Protected by peel-off sheet.

Mirrored Polarizing Sheet E37,896 $47.50



GLASS MOUNTED ROUND POLARIZING FILTERS

Laminated glass and polarizing material. Provide variable density polarizing. Made by Polaroid.

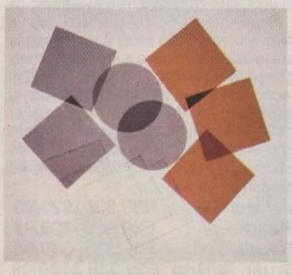
Number	Price	Dia.	Thick	Trans.
E34,881 (Pkg. of 2)	$ 6.75	20mm	2mm	20%
E36,438 (Pkg. of 26 filters)	42.50	20mm	2mm	20%
E32,468*	9.75	23mm	2mm	20%

*Pkg. of 2. One cover glass in neutral filter.

POLARIZED STRESS TESTER

Handy pocket-sized tester is used to check stress patterns in liquids, liquid crystals, plastics and gemstones. Shows fracture marks and flaws not visible with the naked eye or with many magnifiers. Useful in checking the hardness formation of lenses. Brings out the Maltese Cross pattern visible only in properly hardened lenses. 3″ × 3″ when foled; 3″ × 6″ when open. Black.

Polarized Stress Tester E34,521 $11.50



POLARIZER EXPERIMENTERS KIT

- **Ideal Classroom Teaching Aid**
- **Handy Laboratory Supply Item**

Learn the basic principles of polarized light and perform hands-on experiments. Kit contains various pieces of polarizer and retarder materials plus a problem/experiment sheet. Eleven 2″ square/2″ dia. pieces are packed in a clear plastic hinged box. Includes: square and round linear polarizers, square ¼ wave retarder, square ½ wave retarder and square sunglass polarizers.

Polarizer Kit E38,490 $16.95
10 or More, $14.50 Each

HIGH PERFORMANCE VACUUM PICK-UP TWEEZERS

New technology provides the ideal vacuum pick-up for clean-room work where oil free operation and low noise are required. Compact design pump measures 5.7" L x 3.3" W x 5.3" H and weighs 2.7 lbs.; 110V/15W. Maximum vacuum is -9.84 inch Hg. Includes: pump, hand piece (.5" dia. x 5.7" long), tubing, rest stand, and 2 suction pads. Acts as a micro vacuum duster using the discharge outlet.

Rated Voltage: 115V **Rated Vacuum:** -200mmHg (-7.87" Hg)
Max. Vacuum: -250mmHg (-9.84" Hg) **Pad Dia.:** 4mm (0.16"), 6mm (0.24")
Coil Insulation: Equivalent to Class E
Suction Force: 10g (0.02 lbs.), 30g (0.06 lbs.)

Complete Set E36,052 $339.00
Replacement Pads (10 ea. of 4mm & 6mm) E36,412 $24.95

VACUUM PICK-UPS

A) Vacuum Pressure Pump. Continuous operation to 20" of mercury of 17 psi with free air capacity of 900 cubic inches per minute. Motor: 1/45hp at 1550 rpm. 115VAC, 60Hz. 7-1/4" x 4" x 5-1/2".

Vacuum Pump E31,057 $179.95

B) Vacuum Pick-Up Tool. Attaches to most suction motors. 5" long. Metal and plastic body. 40" flexible tubing. Collect small, delicate items, including lenses, prisms and metals. Use to hold small items during sensitive assembly projects. With one tip.

Vacuum Pick-Up E33,459 $210.00

HAND-HELD VACUUM PUMP

Made of high impact plastic, pump as 2 ft. of 1/4" tubing, 5" tall lifter with 2-1/2" dia. cup that attaches to end of tubing. Grips non-porous surfaces as vacuum is created. 1-5/8" dia. gauge registers 0 to 30" of mercury. Overall 7" x 4".

Pump, Gauge & Lifter E71,301 $43.95
Pump Only E71,300 $29.95

MINIATURE SCREW MOVEMENT ADJUSTABLE SPANNER WRENCH

Screw drive adjusts blade spread from 17mm (5/8") to 58mm (2-1/4"). Blade face is straight flat, 2.5mmL x 1mmW. Case measures 1-1/8" W x 2-3/4" L x 3/8" T and is all metal construction. Tempered pins. Compact size for convenience.

Pocket Case Wrench E37,576 $13.25

STATIC DUSTING BRUSHES

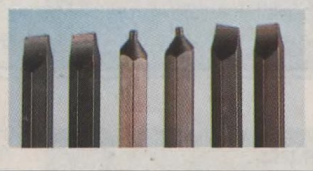
Static brushes will dissipate static and remove dust. A special blend of natural hair and conductive fiber is carefully hand sewn with stainless steel wire. Brush is soft, gentle and safe to use on sensitive materials such as lenses, film and computer screens. The static is simply drained off by the conductive fiber while the natural blend of fine goat hair whisks away the dust. The 3 smaller brushes (1.5", 3", 4") have a built-in hoop handle and are ideal for optics and instruments. The larger 12" wide brush has a double row of brushes with a foam covered grip and is ideal for computer screens.

1-1/2" Brush W/Handle E39,335 $29.95
3" Brush W/Handle E39,336 $39.95
4" Brush W/Handle E39,337 $49.95
12" Double Brush W/Grip E39,338 $150.00

EDMUND SCIENTIFIC'S SPANNER WRENCH SET QUICKLY AND EASILY REMOVES RETAINING RINGS WITHOUT DAMAGE

Fully adjustable set with the strength to easily remove stubborn retaining rings without causing damage. Adjustable from 1/2" to 7". Hex-bodied tips slip into hex-hollowed arms and lock securely with set screws. Strong, sturdy aluminum bodies and locking knobs. Easy to assemble wrench includes three sets of tips—straight blades 3/16" L x 1/32W & 3/16" L x 1/16" W, round point 1/16" dia.—which fit most retaining rings. Other tip shapes can be ground to suit your individual needs. Includes 3-1/2" and 7" high tensile steel hex bars, and set of adjustable arms, 3-1/2" to 3" below wrench body.

Spanner Wrench Set E70,751 $59.95



Replacement Tips Includes three sets: straight blade 3/16" L x 1/32" W; straight blade 3/16" L x 1/16" W; pencil point 116"dia.

E37,565 $18.75

ADJUSTABLE MINI SPANNER WRENCH

High grade steel set with chrome blades and thumb-screw locking. Adjustable from 1/4" to 4-5/8" dia. Includes: two 3/16" dia. slide bars, two 3/8" steel ball quick-change receptacles, three sets of chrome tips, straight pencil point, straight flat and 1/4" offset. Vital for use with optical instruments and for removing lock rings.

Mini Spanner Wrench E31,817 $47.95

Replacement Chrome Tips. Includes three sets: straight pencil point, straight flat and 1/4" offset. **Replacement Tips** E37,566 $19.95

MINI-SPANNER WRENCH

Adjustable from 7/8" to 6" dia. Includes: two slotted steel plates 3-1/2" W x 4" H with locking thumb screws, six sets of tips, straight flat, pencil-points, 1mm, 1.2mm, 1.5mm, 2mm and 2mm offset. Set screws hold tips in place.

Spanner Wrench E36,156 $52.00

MINI-SPANNER WRENCH SET

Two permanent tip spanner wrenches, each adjustable from 1/4" to 3-1/4"; machined anodized steel construction, each has two 3/16" dia. slide bars, two 3/8" dia. x 4" long arms with locking screws; permanent tips are 1/16" diameter offset pencil points on one tool and 3/16" offset straight flat on other.

Mini Spanner Set E36,413 $39.95

MINISPAN SPANNER WRENCH

A hand-held precision spanner wrench kit for miniature and delicate work. Set includes 16 individual tips which snap in and out of the knurled aluminum handle. A solid spring ball detent system holds the tips in place. Tips are made of quality tool steel, hardened and ground. Handle: 5-1/2" L x 7/8" Diameter **Tips: (mm)** 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0.

Minispan Wrench Set E38,073 $95.00

FLEXICLAMP WRENCHES

Collet-like grip. Only safe and easy way to remove lens cells and mounts, filter rings, accessories, dowels and similar smooth ring and round parts. Machined of tough, non-marring fabric-reinforced phenolic. Complete set of 20 wrenches, sizes listed below (5/16" to 2").

E38,072 $110.00

Inch	= mm	Inch	= mm
5/16	8.0	1	25.5
3/8	9.5	1-1/8	28.5
7/16	11.0	1-3/16	30.0
1/2	12.5	1-1/4	31.5
9/16	14.0	1-3/8	35.0
5/8	16.0	1-1/2	38.0
11/16	17.5	1-5/8	41.5
3/4	19.0	1-3/4	44.5
7/8	22.0	1-7/8	47.5
15/16	24.0	2	50.8

UV PROTECTIVE EYEGLASSES

Polycarbonate UV protective eyeglasses are certified to completely filter out light wavelengths from 200 to 540nm, providing complete blockage of the ultraviolet spectrum. With 93% transmission at 650nm and above, they provide excellent visibility for the balance of the visible spectrum. UV wavelength inhibitors are homogeneously dispersed throughout the lens, preventing dangerous leaks, that occur in surface coated lenses if scratched. Virtually unbreakable polycarbonate lenses allow comfortable long term wear while assuring maximum protection. Meet all the requirements of ANSIZ287.

Standard Metal Frame Protective Glasses **E38,031 $85.00**
Clip-On Protective Glasses **E38,032 $65.00**

LENS DIOPTER GAUGE

Precision optics gauge will not scratch glass lenses. Measures positive and negative lenses 21mm diameter and larger. Directly reads curvatures from 0 to 17 diopters in one-quarter diopter increments. 2" diameter gauge with directions.

Diopter Gauge **E34,647 $165.00**

RECHARGEABLE ATOMIZER SPRAYERS FOR LENS CLEANER & OTHER SOLUTIONS

Refillable, rechargeable sprayer handles most solutions, even harsh industrial cleaners. Pressurized with ordinary air (use air compressor producing 80-150 psi) eliminating costly or explosive propellents found in most aerosols. Large 16 fluid oz. capacity permits extensive spraying per charge. Easy to take apart for cleaning.

Aluminum Sprayer: for use with ammonia-based solutions/light liquids, 9-1/2" H, 16 oz. capacity, 80-150 psi. **E36,604 $34.95**

Stainless Steel Sprayer: for strong agents and corrosive chemicals. 10-1/4" H, 16 oz. capacity, 80-150 psi. **E36,603 $57.95**

Edmund Lens Luster Cleaner: formulated for high quality optics. 1 gallon container. **E36,865 $44.95**

POLARIZED STRESS TESTER

Handy pocket-size tester is used to check stress patterns in liquids, liquid crystals, plastics and gemstones. Shows fracture marks and flaws not visible with the naked eye or with many magnifiers. Useful in checking the hardness formation of lenses. Brings out the Maltese Cross pattern visible only in properly hardened lenses. 3" x 3" when folded; 6" x 3" when open. Black case.

Polarized Stress Tester E34,521 $11.50

NYLON JAW PLIERS

Double nylon jaw plier will not scratch or damage lens surfaces. Ideal for holding lenses, fiber optics, glass filters during assembly or repair. Length overall: 5-3/4"; Jaw length: 1". Plastic coated sure-grip handles. Weight: 4.5 oz.

Nylon Jaw Pliers **E38,508**

SOFT JAWED PLIERS FOR OPTICS/INSTRUMENTS

Slip joint 3-position design. Ideal for handling mounted optics such as camera lens assemblies from 1/2" to 2-1/2" dia. Non-slip cushions in jaws protect fine knurling and delicate finishes. Jaws: Urethane 88A Durometer; Steel, Laminated, Heat Treated; Black Oxide Finish; Length: 9-3/4"—247mm; Weight: 12 oz.—.35 kilo; rolled vinyl handles.

Pliers **E60,832 $31.95**
Replacement Cushions (2) **E30,664 $7.75**

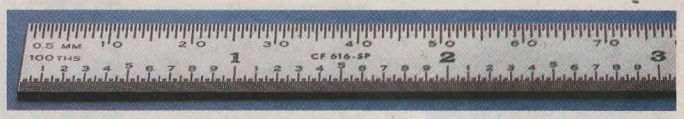
PRECISION METRIC THICKNESS GAUGE

- **Ideal For Measuring Optical Elements**
- **Accurate Enough To Measure Paper Thickness**

Precision gauge features all metal construction, blue-enamel finish on body, stainless measuring jaw, metric conversion chart on back of body and vinyl case. Made in Japan.

SPECIFICATIONS:
Range: 0 to 12.5mm. **Graduations:** 0.01mm.
Overall Dimensions: 65mmL x 55mmH x 10mmT (2-1/2" x 2" x 3/8").

Thickness Gauge **E34,773 $170.00**

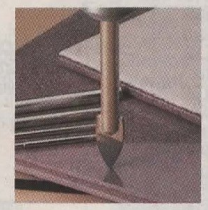


OPTICIAN'S STAINLESS STEEL RULE

- **Four Scales In Millimeters, 100ths Inch, 32nds Inch, 64ths Inch**

Precision stainless steel rule has four scales in metric and english for quick conversions. Front face has millimeter scale graduated in 0.5mm increments and inch scale in 1/100th increments. Back face has inch scale graduated in 1/32nd increments and inch scale graduated in 1/64th increments. Scale is 6 inches/152mm long.

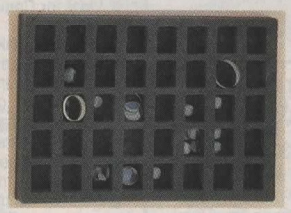
Optician's Rule **E35,321 $5.75**



TUNGSTEN CARBIDE DRILLS

Drill bits glide through any glass product effortlessly.

Size	Number	Price
1/8"	E41,517	$8.25
3/16"	E41,518	$8.75
1/4"	E41,519	$9.75
5/16"	E41,520	$12.75
3/8"	E41,521	$13.75
1/2"	E41,522	$15.50



FOAM OPTIC SORTING TRAYS

Polyester foam is 2 lb./cu. ft. density, supportive but gentle. Each tray measures 8-1/2" x 11-7/8" and has 40 cutouts, 1-1/4" x 1" . Chip board backing keeps tray rigid and stackable. Light gray. Meets specs of Mil-O-26514E, Mil-C-26861A and UL94HF1.

Foam Trays **E36,081 $11.75 Each**
4 or More, $10.75 Each

SPECIMEN BOXES

Component display/storage case is ideal for small optics and other precision miniature components. Magnetic catch flaps on cover, 16 individual clear acrylic modules 1-1/2" diameter x 1/2" deep with foam insert. Measures 8-1/2" L x 7-1/2" W x 1-1/4" H overall.

Specimen Boxes **E37,564 $23.95**

ENGLISH MUSEUM DUSTING BRUSH

- **Ideal For Glass Surfaces**
- **Photo, Optical, Scientific Apparatus**

Hand made from the finest goat hair, this brush was originally designed for the delicate requirements of museum curators. The softness, pliability, gentleness, and abundance of goat hair in the brush ensure an efficient and safe removal of dust, the dulling and abrasive enemy of delicate surfaces. Features a hardwood handle and acrylic retainer. Measures 12" long, handle diameter 1" maximum, bristle diameter 2-1/2" approximately. Made in England.

Delicate Surface Dusting Brush
E38,320 $27.95

HI-TECH WEST GERMAN LENS BRUSH

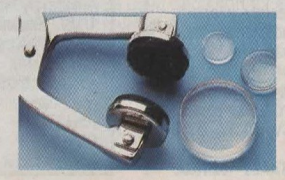
Unique design bulb fits the hand comfortably and provides greater air burst. 3/4" long bristles are extra-soft for delicate surfaces. Overall, brush measures 4-1/4" long x 1-1/2" diameter.

Lens Brush **E36,433 $9.95**

SOFT LENS BRUSH

Preserve fragile lenses from dust. Brush gently removes dust and lint from lenses. 1" long with retractable bristles. Plastic case 2-1/2" x 3/4".

Soft Lens Brush **E40,504 $4.95**

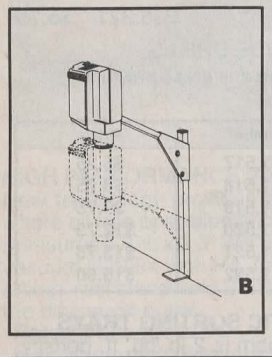


LENS ALIGNER PLIER

Heavy duty axis aligning plier features a wide opening 2" Wx1-1/2" Deep. Tips are pivot-mounted, self-aligning through 70° with one inch diameter firm rubber cushions that will not scratch lens surface. All metal construction, overall length 8", weight 7 oz.

Lens Plier **E38,509 $32.95**

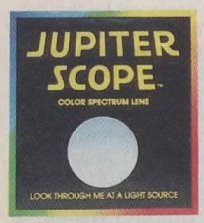
A) 20X ENLARGING ART PROJECTOR WILL ALSO REDUCE
Versatile opaque projector accepts original copy size of 6½" x 6½". Top loading; ideal for projection of photos, lettering, logos and drawings. Standard lens (supplied) will enlarge 2 to 20X. 400W illumination. F/4.8, 225mm lens., 60cfm cooling fan, 115V, 3.3amps. Wt. 10 pounds. **E35,780 $179.95**



B) Stand for Vertical Projection. Clamps to drawing board and includes accessory lens for 3X enlargement to 55% reduction. **E38,653 $150.00**
High Grade 5-Element Color Corrected Projection Lens. Provides ultra-sharp, high-definition image for fine detail work. Also enlarges 20X.
E38,652 $150.00

300 WATT PORTABLE OPAQUE PROJECTOR
- **6" x 6" Stage**
- **f3.5/230mm f.l. Lens**

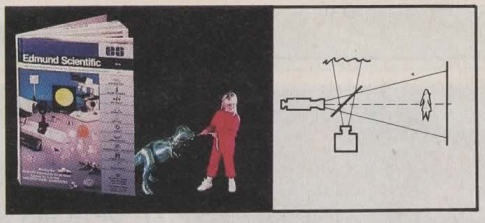
Project brilliant, full-color images from any opaque material (photo prints, drawings, book pages, etc.) or even 3-dimensional small objects. Projection stage measures 6" x 6" . Features f3.5/230mm f.l. (7¼") multi-element coated projection lens, 300W projection lamp, pilot lamp for projectionist and built-in handle. 110V, 5 ft. cord, 2 prong plug. Magnifies up to 20X depending on projection distance.
Projector E38,059 $375.00
Extra Lamp E38,060 $39.00



JUPITERSCOPE RAINBOW LENS
Look through this soft plastic lens at any light source and see a starburst of spectral colors. Lens contains 150,000 tiny prisms. Adheres to glass window or camera lens (spectacular special effects).
E36,769 $3.75
3 or More, $3.25 Each

TRIPOD ADAPTS TO YOUR DEMANDS
Multi-use tripod can be hand-held, used as a window mount or as a standard tripod. Can be mounted on standard camera tripods by threading the socket onto tripod's ¼ x 20 mounting screw. Black metal.
Tripod E34,277 $29.95

APOLLO A1-1000 OVERHEAD PROJECTOR
A quartz halogen bulb shines through high-resolution optics to project sharp images uniformly. Hi-low lamp switch increases lamp life, saves energy. Features thermal cut-off switch, tilting projection, safety interlock, two-way acetate roller attachments. Stage aperture 10" x 10"; overall dimensions (closed) 12½"W x 14"L x 10"H. Lens and focusing column store in body of projector. AC 100-120V 60Hz standard power source. Quartz Halogen lamp: 120V, 600W, DYS. Metal body; 17 lbs.
Overhead Projector E37,490 $299.00



CREATE DRAMATIC BACKGROUNDS WITH BEAM SPLITTERS
By combining a beam splitter with a front projection system—the same Oscar-winning technique used in "2001: A Space Odyssey"—you can place photo subjects in any setting you desire. Used by TV stations, this technique is great for movie cameras and 35mm SLR's. For an almost totally neutral beam splitter, we recommend the 40R/60T type. Instructions included. High uniformity-glass. R/T indicates Reflectance/Transmittance.

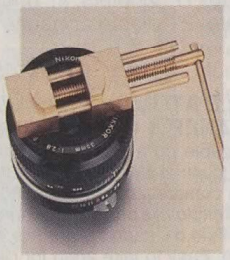
Size	R/T	Item	Price
5" x 7"	30R/70T	E61,097	$28.85
10" x 14"	30R/70T	E72,500	$77.50

Anti-Reflective Coated. Eliminates ghost images since coating reduces the rear surface reflection to less than ½ of 1 percent. Coatings are neutral over visible spectrum.

Size	R/T	Item	Price
5" x7"	40R/60T	E61,260	$28.85
5" x7"	30R/70T	E43,362	$28.85
10" x14"	40R/60T	E72,502	$77.50
10" x14"	30R/70T	E43,363	$77.50

LENS RING MOUNT VISE
- **Ideal for Camera Lens Repair**

Unique tool makes repairing a lens ring ding a snap. Just fit the tool inside a dinged lens filter and screw it out. The bent edges come right out. Developed by a camera technician. Quality chrome construction. Works on lens mounts and filter rings from 28mm to 85mm diameter. **E38,646 $57.00**



REVERSE ADAPTERS
Turn your 35mm camera lens into a close-up lens. Also can be used with bellows and extension tubes. Screw onto the filter ring of 35mm camera lens and remove the entire lens. Screw the lens into the camera in reverse. Brings 50mm lens approximately 1 inch from subject. 2-3" lens focus is adjustable as lens is rotated. Metal.

Camera	Thread Dia.	Item	Price
Pentax	49mm	E42,373	$14.95
Minolta	49mm	E42,376	$14.95
Minolta	55mm	E37,494	$23.95
Nikon	52mm	E42,377	$14.95
Canon	52mm	E42,378	$18.95
Olympus	49mm	E42,375	$23.95

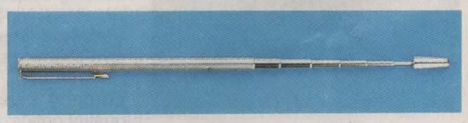
PHOTO/LAB KEYCHAIN FLASHLIGHT
- **Red Light Doesn't Destroy Night Vision**
- **Ideal for Astronomy, Darkroom, Night Driving**

Sleek and compact keyring light is the first with a bright red beam to provide unparalleled night vision by concentrating the light where you want it most. It works like the red lights used by airplane pilots to read their instrument panels. Made of durable Titanium metal, "Private Eye" is virtually indestructible. Comes with two 1.5V alkaline batteries. Easy to add or remove keys. Backed by Tekna's lifetime warranty. Stainless Steel Key Ring pivots 360°, directing the red beam toward keyholes while you unlock the door.
SPECIFICATIONS:
Weight: 6.4 Oz. With Batteries; **Length:** 1.5 Inches; **Diameter:** .625 Inches; **Housing:** Titanium and Plastic; **Battery:** Two 1.5V Alkalines
E38,720 $17.95
2 or More, $16.00 Each

DICHROIC FILTERS FOR HIGH COLOR SATURATION
Amazingly beautiful thin interference filters on glass 2 x 2 x 1/16". Experiment at various angles, watch them change color, showing their ability to block out certain wavelengths of light. Put in a projector's slide gate to make a color spotlight that will emit "purer" colored light than ordinary color filters.
Red Filter E30,634 $18.75
Blue Filter E30,635 $18.75
Yellow Filter E30,637 $18.75

PUT YOUR OLD HOME MOVIES AND SLIDES ON VIDEO
Easily convert movies and slides to videotape. Set your movie or slide projector and focus the image onto the mini-screen on the front of the Tele-Cine converter. Aim your video camera into the lens. Focus and start recording. Can be used with any video camera. 6½" x 5½" x 5". Screen is 3" x 3½".
Tele-Cine E33,528 $59.95

IT CAN BE SEEN ON A TV SCREEN
Here's a flashlight pointer so bright and sharply focused that its high intensity arrow of bright white light can be seen up to 30 feet away in lighted areas . . . 75 feet in dark rooms. 6½" pointer. Takes 4 "AA" batteries (not incl.). Weighs 5 oz.
Flashlight Pointer E33,081 $21.95
Three Extra Bulbs E34,187 $7.95

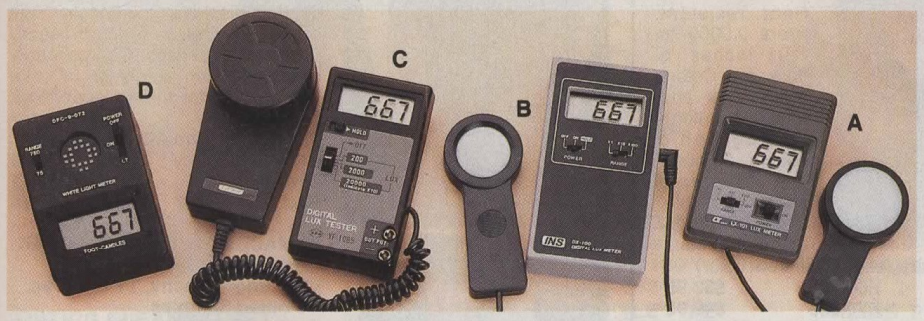


POCKET POINTER
Telescoping Pointer is unbeatable for showing highlights in movies, charts, blackboard lessons, audio-visual demonstrations and more. Extends to 25½". Chrome with pocket clip and point cap. An unusual and much appreciated item for teachers, engineers, salesmen, students and executives.
Pointer E35,965 $6.50

ILLUMINATED SLIDE VIEWER WITH 3X MAGNIFIER
Economical compact viewer lets you examine 35mm slides or negative strips. Illuminator powered by 2 "AA" batteries (not incl.). Optical quality 3X acrylic magnifier measures 1½"W x 2"L and can be removed from the base for other usage. 3¼" high x 2½" wide x 2¾" long. **E36,239 $5.50**
3 or More, $4.50 Each

MINI-CUBE MAGNIFIED SLIDE VIEWER
2¾" mini cube viewer is just slightly larger than a 35mm slide. Compact and lightweight. Powered by 2 "AA" batteries (not incl.), acrylic magnifier viewing screen.
E37,414 $5.25

VIEW-THRU MAGNIFIED SLIDE VIEW
Hold unit to your eye for brilliant magnified view. Measures 5½"L x 2¼"W x 1"T. Powered by 2 "AA" batteries (not incl.).
E37,415 $4.95



PORTABLE DIGITAL LIGHT METERS

- **Ranges From 0 to 100,000 LUX**

Ideal portable instrument for measuring work area light levels or for laboratory use. All units feature large easy-read ½" LCD display with 3 digits, work light level chart to determine proper light levels for factory, office, house, store, hospital, school and restaurant. Each includes vinyl case and instructions. Powered by 9V battery (not incl.)

A) 0 to 100,000 LUX METER

Basic laboratory/environs meter features 3-range selector switch, on/off switch, auto zero adjust, low battery indicator and 2" dia. light sensor with fixed 3 ft. cord. Weighs: 6 oz.; Dimensions: 4½"L × 2⅞"W × 1"T.

SPECIFICATIONS:

Range	Resolution	Accuracy (25 + 5°C)
2,000 Lux	1 Lux	± (2% + 2d)
20,000 Lux	10 Lux	± (2% + 2d)
50,000-100,000 Lux	100 Lux	± (5% + 2d)

Operating Temperature: 0° to 50°C (32° - 122°F)
Operating Humidity: Less than 80% R.H.
Zero Adjustment: Automatic adjustment.
Over-Input: Indication of "1"
Sampling Time: 0.4 second.
Battery Life: Consumption current approx. 2mA 150-200 hours in continuous use.

0-100,000 Meter E38,039 $122.00

B) 0 to 100,000 LUX METER

High precision meter features 3-range selector switch, on/off and data-hold switch, low-battery indicator and 2" dia. silicon photo-cell sensor with detachable 3 ft. cord. Weighs: 5.6 oz.; Dimensions: 5¼"L × 2⅞"W × ⅞"T.

SPECIFICATIONS:

Range	Resolution	Accuracy
0-2,000 LUX	1 LUX	
2,000-20,000 LUX	10 LUX	±2% of rdg
20,000-100,000 LUX	100 LUX	±1 digit

Operating Temperature: 0-50°C
Operating Humidity: Less than 80% rh
Over Range Signal: Indication of "1"
Sampling Time: 0.3 Seconds
Battery Life: Approx. 150 hours in continuous use.

0-100,000 Meter E38,423 $215.00

C) 0 to 10,000 FOOTCANDLE METER

Basic laboratory/environs meter features 3-range selector switch, on/off switch, auto zero adjust, low battery indicator and 2" dia. light sensor with fixed 3 ft. cord. Weighs: 6 oz.; Dimensions: 4½"L × 2⅞"W × 1"T.

SPECIFICATIONS:

Range	Resolution	Accuracy (25+5°C)
200.0 Ft.-Candle	0.1 Ft.-Candle	± (5%+2d)
2000 Ft.-Candle	1 Ft.-Candle	± (5%+2d)
10,000 Ft.-Candle	10 Ft.-Candle	± (10%+2d)

Operating Temperature: 0° to 50°C (32°-122°F)
Operating Humidity: Less than 80% R.H.
Zero Adjustment: Automatic adjustment
Over-Input: Indication of "1"
Sampling Time: 0.4 second.
Battery Life: Consumption current approx. 2mA 150-200 hours in continuous use.

0-100,000 Meter E38,609 $215.00

D) 0.1 to 20,000 LUX METER

Laboratory Lux meter features analog output for recording long time period tests (connects to most std. lab data recorders/not included). 3-range and off switch, data-hold switch for holding test values, iodine-sealed 2½" dia. lux cell with fixed 3 ft. cord. Weighs: 9 oz.; Dimensions: 4⅝"L × 2½"W × ⅞"T.

SPECIFICATIONS:

Range	Allowance	Remarks
0-200 LUX	±4% rdg 0.5% f.s.	Color temperature
0-2,000 LUX	Lux-sensing angles:	2856°K corrected by
0-20,000 LUX	30° = below ± 2%	a standard bulb.
	60° = below ± 7%	
	80° = below ± 25%	

Operating Temperature: 0-40°C
Operating Humidity: Less than 80% rh
Output of Recorder: DC20 mv F.S.

0.1 to 20,000 Meter E38,424 $285.00

E) SWITCHABLE LUX/FOOTCANDLE METER 0 to 50,000 LUX/0 to 5,000 FOOTCANDLES

Our dual scale lightmeter allows you to measure in either lux or footcandles and to record your data via analog output. Features scale selector switch, 3-range and off selector switch, data-hold switch and 2" dia. selenium photovoltaic sensor with fixed 3 ft. cord. Weighs: 9.4 oz.; Dimensions: 6¾"L × 2¾"W × ⅛"T.

SPECIFICATIONS:

Range	Resolution	Accuracy (23±5°C)
200 Ft.-Candle	0.1 Ft.-Candle	± (5%+2d)
2,000 Ft.-Candle	1 Ft.-Candle	± (5%+2d)
5,000 Ft.-Candle	10 Ft.-Candle	± (5%+2d)
2,000 LUX	1 LUX	± (5%+2d)
20,000 LUX	10 LUX	± (5%+2d)
50,000 LUX	100 LUX	± (5%+2d)

Operating Temperature: 0° to 50°C (32°-122°F)
Operating Humidity: Less than 80% R.H.
Over-Input: Indication of "1"
Sampling Time: Approx. 0.4 second.

LUX/Ftcdl. Meter E38,610 $339.00

F) 0 to 1250 FOOT CANDLES METER

Precision laboratory meter meets MIL standards and NBS traceability. Features 2-range switch, on/off and display backlight switch, low battery indicator, rechargeable long-life NiCad battery with detachable charger, built-in 1" dia. selenium hermetically-sealed photo-cell. Weighs: 5.5 oz.; Dimensions: 4"L × 2¾"W × 1⅛"T. Calibration certifcate supplied with each unit.

SPECIFICATIONS:

Range	Accuracy	Resolution
0 to 75.0	±5%	.1 Foot candles
75.0 to 1250	±10%	1 Foot candles

Operating Temperature: −20°C to 55°C
Operating Humidity: 95% non condensing
Sampling Time: 3 samples per second
Battery Life: 40 hours in continuous use
Recharger: Input 120V-60Hz-3W
Output 12VDC 50mA

0-1250 Meter E38,425 $695.00

THREE RANGE LIGHT METER

Meter automatically corrects for color quality and incident light angle. Three switch-selected ranges give accurate readings from 10 to 1000 footcandles. Linear scale ranges. Taut band meter suspension. Weighs four ounces. With sensing element shield & case. 1½" × 2½" 3¼".

E34,178 $89.95

SOUND LEVEL METER

Two-scale, direct reading decibel meter. Low scale indicates 40 to 80 dB. High scale indicates 80 to 120 dB. Includes battery check and calibration settings. Window size 1⅛" × 2". Unit dimensions 6.3"L × 2.6"W × 1.5"T. Weighs 5.82 oz. with vinyl case. Power requirements: one 9V battery (not incl.). Unit suitable for use in home, school or industry.

Sound Level Meter E38,732 $130.00

SPECIFICATIONS:

Range: 40-80 dB; 80-120 dB
Standard: JIS d b(A) specification
Dimensions: 6.3"L × 2.6"W × 1.5"T
Weight: 5.82 oz.
Power Requirements: 9V battery (not included)

A) ENLARGING LENS

Zeiss Tessar, focal length 45mm, speed f/2.8. Coated optics mounted in metal housing. 2³⁄₁₆" diameter. Spring loaded iris diaphragm. Covers 35mm film size. Was $45.95. E42,201 $24.95

B) 45mm Lens Bargain

Schneider-Kreuznach Braun-Xenar f/2.8 Compur lens. 45mm lens comes on bayonet mount with spring-loaded automatic aperture and depth of field settings. Adjustable focus from .9m to infinity. Great for experimenters, hobbyists, and 35mm enthusiasts! E42,117 $15.00

C) ZOOM 8mm PROJECTION LENS/MAGNIFIER

19-25mm f.l. f/1.6, alum. barrel ⅞" dia. × 1½"L. Magnifier in reverse. E40,874 $7.95

D) TELESCOPE OBJECTIVE/B&L COPY LENS

8¼" f.l. coated lens system, iris diaphragm f/4.5-f/8, 2½" O.D. × 2"L, coverage 6 sq. in.; telescope objective for RFT. E41,484 $10.75

35MM OR VIDEO MIRRORSCOPE SPY LENS

Allows you to point in one direction but photograph at a 90 degree right angle to the side. For use with telephoto lens 85mm f.l. or longer. 2¾" diameter, 3⅜" length. Weighs four ounces. Mounts onto SLR lens with adapter rings listed below.

Spy Lens E35,384 $64.95

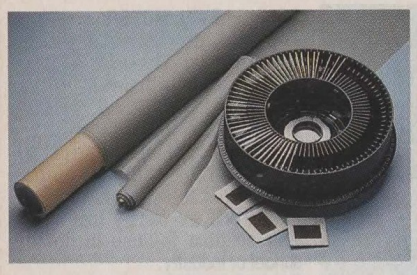
Adapters $8.25 Each

49mm	E35,387	52mm	E35,388
55mm	E35,389	58mm	E35,390
62mm	E35,391	67mm	E35,392

NOW, A KALEIDOSCOPE FOR YOUR CAMERA!

We call it the Camerascope® and it will transform ordinary, everyday scenes into a dazzling collage of photographic images and color for your 35mm camera. Hundreds of unique picture possibilities. Easy to use without specialized photographic skills. Camerascope® attaches directly to your 35mm camera lens with a filter ring (included). Can also be used with short focal length telephoto and wide angle lenses or hand held for direct viewing. Sturdy, built-to-last construction. 6½" long 2¾" diameter, weight 12 oz. Makes ideal gift for any camera enthusiast that likes the unusual. Important—when you order, specify the name of your camera and filter ring size it requires.

49mm	E37,914 $115.00
52mm	E37,915 $115.00
55mm	E37,916 $115.00



SPECIAL REAR PROJECTION SCREEN MATERIAL LETS YOU VIEW FILMS AND SLIDES IN DAYLIGHT

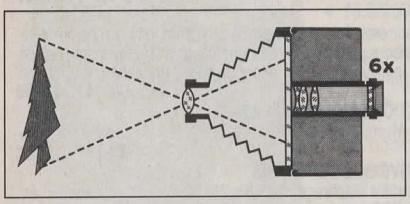
Tough, elastic, vinyl-type fabric is capable of transmitting life-like projected images and audio visual presentations in nearly any lighting condition. Resists fire, yellowing and fungus. Reversible. In cases where strong overhead or side lighting strikes the screen front, the polished side mounted forward can deepen picture contrast and improve resolution.

1' x 1' Sheet	**E70,934**	**$14.50**
3' x 3' Sheet	**E70,935**	**$79.95**

GLASS REAR PROJECTION SCREEN

Replace ground glass with this gray glass screening. Provides optimum contrast, sharp, clear images and better diffusion.

20" x 24" x 1/8"	**E85,002**	**$94.95**
10" x 12"	**E70,047**	**$29.95**



B) FOCUSCOP™ 6X CAMERA SCREEN MAGNIFIER

• From Arthur Seibert of Germany

Three element optical system is designed to rest directly on the ground-glass screen of view or reflex cameras. Soft rubber ring in base protects screen. Enlarges image 6X, over 15mm diameter field to allow critical focus of details. Fully color corrected and coated lens system is housed in a 4-1/4" tall precision aluminum housing which is tall enough to extend beyond focusing hoods. Adjustable focus, velvet-padded leather case and removable neck strap.

Eye Lens Diameter: 21mm, **Height:** 110mm, **Field of View:** 15mm diameter, **Working Distance:** 3mm, **External Diameter:** 45mm.

Screen Magnifier **E36,936** **$150.00**

FLOCKED PAPER

Velvet-like, non-reflecting surface provides countless light traps, far superior to flat paint. Variety of colors. Adhesive and non-adhesive backing.

Non Adhesive 27" x 36" Sheets. #40 basis paper. **Pkg. of 2 Sheets. $7.50 Each**

Black	**E60,068**	**Brown**	**E35,143**
Blue	**E35,144**	**Red**	**E35,141**
Silver Gray	**E35,145**		

Pressure Sensitive 20" x 30" Sheets. #55 Coverweight. Adhesive backing.

	One Sheet		50 Sheets	
Black	**E70,621**	**$7.50**	**E70,622**	**$149.00**
Green	**E35,146**	**$7.50**	**E35,147**	**$149.00**
Red	**E35,148**	**$7.50**	**E35,149**	**$149.00**

EASY-TO-CUT TRANSPARENT FILTERS

Heat resistant filters 0.0005 to 0.01 inches in thickness. Colors are vibrant and fine for striking photographic effects. Booklets and separate sheets available. Order sheets by stock numbers.

A) Book of 44 Filters (each a different color)

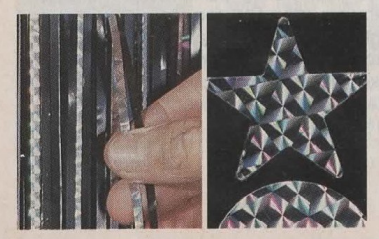
5" x 8"	**E60,403**	**$33.95**
8" x 10"	**E70,638**	**$49.95**
1-1/2" x 3-1/4"	**E40,675**	**$6.25**

B) Book of 6 Filters (red, green, blue, medium blue-green, magenta, yellow)

8" x 10"	**E60,373**	**$16.00**
2" x 2"	**E40,676**	**$4.50**

C) Individual Sheets 20" x 24" $9.95 Each:

Number	Color	Thickness (ml)
E82,000	Frost	5-1/2
E39,376	Bastard Amber	6
E39,377	No Color Straw	6-1/2
E39,378	Light Straw	6
E82,004	Med. Lemon	6
E39,379	Dk. Lemon	6
E39,380	Straw	6
E39,381	No Color Amber	6
E39,382	Flame	6
E39,383	Light Amber	6
E82,010	Golden Amber	5-1/2
E39,384	Dk. Amber	6
E82,012	Orange	5-1/2
E39,385	Orange Amber	5-1/2
E39,386	Light Red	7-1/2
E82,015	Med. Red	5-1/2
E39,387	No Color Pink	6
E39,388	Flesh Pink	6
E39,389	Bright Pink	6
E39,390	Follies Pink	6
E39,391	Rose Pink	6
E39,392	Salmon Pink	6
E39,393	Plush Pink	6
E39,394	Med. Magenta	6
E39,395	Dk. Magenta	6
E39,396	Rose Purple	5-1/2
E39,397	Surprise Lavender	6
E39,398	Surprise Pink	6
E39,399	Special Lavender	5-1/2
E39,400	Med. Lavender	6
E39,401	Violet	6-1/2
E82,029	Med. Purple	6
E39,402	Water Blue	6
E39,403	Pale Blue	6
E39,404	No Color Blue	6
E82,034	Daylight Blue	5-1/2
E39,405	Middle Blue	6-1/2
E39,406	Steel Blue	5-1/2
E39,407	Azure Blue	6
E39,408	Light Blue	5-1/2
E82,038	Lt. Med. Blue	6
E39,409	Lt. Green Blue	6
E39,410	Green Blue	6-1/2
E39,411	Surprise Blue	5-1/2
E39,412	True Blue	5-1/2
E82,034	Dk. Med. Blue	5-1/2
E82,039	Dk. Urban Blue	6
E82,040	Light Green	6
E82,041	Med. Green	6
E39,413	Med. Blue Green	6
E82,043	Yellow Green	6
E39,414	Light Grey	6
E39,415	Light Chocolate	6
E39,416	Med. Grey	6

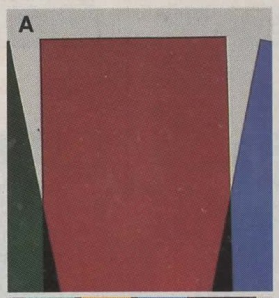


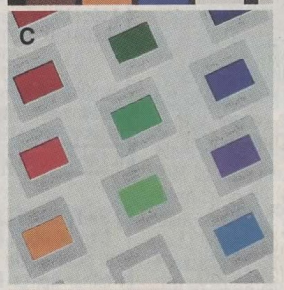
A) SILVER DIFFRACTION GRATING CURTAINS

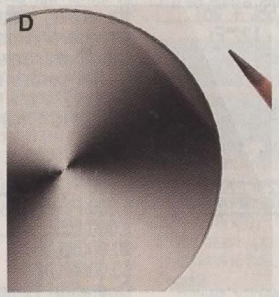
Black woven with silver diffraction material that makes light shimmer and bounce. Made of durable, non-flammable plastic layered in weightless 1/8" strips that move constantly. 36" wide, 8 feet long. **E37,216 $27.95 3 or More, $25.95 Each**

B) DIFFRACTION GRATING ADHESIVE SKIN JEWELS

Exciting, exotic body adornments. They break up light into rainbow colors. Place on skin or clothing. Package of 24 contains four each of six different designs. **E41,294 $6.50**







A) OVERSIZE FILTER SHEETS

Generous 12" x 22" filter sheets for photographic effects, striking home lighting displays, theatricals, light shows, etc. Sheets are approximately 0.2mm in thickness. Can be easily cut. Use them singly or in color combinations for one of a kind effects. Surplus.

Package of Two filter Sheets

Blue	**E35,135**	**$9.75**
Green	**E35,136**	**$9.75**
Red	**E35,137**	**$9.75**

B) MACBETH COLOR CHECKER

• Avoid Color Mistakes

• For Photography, TV Pictures, Printed Samples

A unique "test pattern" of 24 scientifically prepared colored squares designed to help you determine the true color balance or optical density of any color rendition system. Each color square represents a natural object—human skin, foliage, blue sky, etc. They also reflect light the same way in all parts of the visible spectrum.

Color Checker **E37,756** **$44.95**

C) NEW COLOR FILTER SLIDES FOR 35MM CAMERAS

Use your imagination to devise unique and interesting photographic effects with your 35mm camera. Fourteen different colors all mounted on 2" x 2" slides. Colors are: light blue, medium blue, daylight blue, dark blue, golden amber, medium green, light green, yellow-green, light red, medium purple, orange, medium yellow, medium red and frost. Fiberboard mounts.

Effects Kit **E34,517** **$16.50**

D) POLARIZATION AXIS FINDER

Excellent tool for photographers and lighting technicians to control lighting and reflection; has a 2" diameter lens element which is polarized concentrically about the center. Each elemental area of the lens is polarized at 90° to the radii passing through the element area. This arrangement causes a blackout of polarized light in direct alignment with the axis of polarity of the light. In full view of a source of polarized light the Axis Finder lens forms two dark wedges which oppose each other and which meet at the center of the lens. A line through the darkest portions of these wedges is a true indication of the direction of polarization of the light. The darker and broader these wedges appear, the greater the intensity of polarization of the light source.

Axis Finder **E39,077** **$39.00**

E) BETTER GRADE TRANSPARENT COLOR FILTERS

Improved heat resistance and color absorption, these thin film color filters are ideal for a wide range of photographic applications. Each booklet contains the spectral chart for each individual color. Manufactured using a unique technology. Three discrete layers are combined in a tri-extrusion process. By sealing the colored layer between two microscopically thin layers of clear film, dye migration is minimized and effective life is extended. **Book of 100 Different Filters:**

1-1/2" x 3-1/4"	**E39,417**	**$8.50**
3" x 5"	**E39,418**	**$20.00**
8" x 10"	**E39,419**	**$95.00**

F) LIGHT ABSORBING BLACK CINEFOIL

A flexible aluminum foil-type material with a matte black finish which thoroughly absorbs light. Ideal for masking light leaks and eliminating unwanted light reflections. Packaged in 50 sq. ft. rolls with handy dispenser box. Approximately 10 mils thick.

24"W x 25'L	**E39,420**	**$39.95**
12"W x 50'L	**E39,421**	**$39.95**

G) THERMA SHIELD HEAT REFLECTOR

A polycarbonate film with a reflective multi-layer optical coating which reflects most of the damaging infra-red heat emitted by stage, architectural and other high output lighting fixtures. Can reduce transmitted heat by as much as 400°. Transmits 80% light, 20% reflected. 7 mil thickness.

12" x 12"	**E39,422**	**$60.00**
20" x 24"	**E39,423**	**$180.00**

H) FLEXIBLE THIN FILM U.V. FILTER

A virtually transparent flexible polyester filter, specially coated to absorb ultraviolet rays. The material allows less than 10% transmission below 390 nanometers. 1.5 mil thickness.

20" x 24" Sheet	**E39,426**	**$ 7.50**
24" x 50' Roll	**E39,427**	**$170.00**

HEAT SHIELD FILM

A protective transparent filter of extremely heat stable polymer, specially designed to deflect heat. This product should be placed between the bulb and the color filter, allowing space for the escape of heated air. Each sheet is 2 mils thick.

20" x 24" Sheet	**E39,424**	**$12.50**
24" x 50' Roll	**E39,425**	**$300.00**

OPTICS CLEANING SET

Keep your expensive optical collection in top notch shape with these handy cleaning aids. Set includes our 1" long soft lens brush which gently removes dust and lint, 500 of our specially designed optics cleaning tissues, a can of Dust-Off® Junior and two 4-ounce bottles of Lens Luster cleaner.

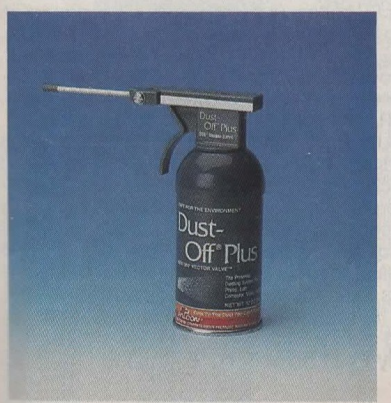
Optics Cleaning Set
E42,697 $24.95

Dust-Off® Junior
(6 oz.) Only E42,980 $ 7.95

EDMUND SCIENTIFIC'S OWN LENS CLEANER

This is the specially formulated optical cleaning fluid which we use in our own optical production shop. It cleans without leaving any residue and does not have the normal annoying odors of many organic solvents. It does not evaporate as quickly as other glass cleaners which is better for precision lens cleaning. Only 30% of its contents are flammable reducing the fire hazard compared to organic solvents. Specially formulated for high quality optics, it has been used to clean military and NASA space optics. Available in a package of two 4-ounce dispenser bottles or gallon bulk containers.

(Pkg. of two 4-ounce bottles)
E42,696 $8.95 Each
3 or More of Above $7.95 Each
12 or More of Above $7.10 Each



STAINLESS TAKE ALONG PUMP TOP DISPENSERS

Dish type pump top dispenser fabricated from stainless steel with twist lock-down top to seal contents for travel. Hinged lid protects dish when not in use.

CAPACITY	BOTTLE TYPE	NUMBER	PRICE
2 oz.	Frosted High Density Polyethylene	E39,319	$12.95
4 oz.	Frosted High Density Polyethylene	E39,320	$12.95
6 oz.	Frosted High Density Polyethylene	E39,321	$12.95
8 oz.	Frosted High Density Polyethylene	E39,322	$12.95
4 oz.	Metal Can	E39,323	$12.95
4 oz.	Amber Glass	E39,324	$12.95

TAKE ALONG/PURITY PUMP TOP DISPENSERS

Dish type pump top dispenser fabricated from stainless steel with twist lock down top feature and anti-contamination, anti-fume purity valve features, plus hinged lid.

2 oz.	Frosted High Density Polyethylene	E39,325	$13.95
4 oz.	Frosted High Density Polyethylene	E35,249	$13.95
6 oz.	Frosted High Density Polyethylene	E35,250	$13.95
8 oz.	Frosted High Density Polyethylene	E35,251	$13.95
4 oz.	Metal Can	E36,298	$13.95
4 oz.	Amber Glass	E36,299	$13.95

MIL-SPEC ANTI-STATIC CLEAN ROOM DISPENSERS

Special high-density polyethylene bottles covered with static dissipative sleeves. Stainless steel pump tops.

SPECIFICATIONS:
Mil-Spec: MIL-B-810705B Type II **Shore Hardness:** 75A
Resistivity: >1 x 10^6<1 x 10^9 ohms/sq. in. (ASTM D257)
Decay Rate: <.05 seconds per Fed. std. 101, meth. 4046

STANDARD STAINLESS PUMP TOP

4 oz.	E39,326	$11.95
6 oz.	E39,327	$11.95
8 oz.	E39,328	$11.95

STAINLESS PURITY PUMP TOP

4 oz.	E39,329	$12.95
6 oz.	E39,330	$12.95
8 oz.	E39,331	$12.95

TAKE ALONG PUMP TOP

4 oz.	E39,332	$13.95
6 oz.	E39,333	$13.95
8 oz.	E39,334	$13.95

PRECISION PUMP FLUID DISPENSERS

No stopper or cap to remove nor any need to touch the bottle. A simple light touch on the dish top dispenses only the required amount of fluid. Eliminate loss to evaporation and spills. Available in a variety of dispenser tops and bottle types.

PLASTIC PUMP TOP DISH DISPENSER

Dish type pump top dispenser molded in white plastic. Most economical models.

CAPACITY	BOTTLE TYPE	NUMBER	PRICE
8 oz.	Frosted Natural Plastic	E39,296	$4.95
8 oz.	Brown Plastic, Unlabeled	E39,297	$4.95
8 oz.	Brown Plastic, "Alcohol"	E39,298	$4.95
8 oz.	Brown Glass, Unlabeled	E39,299	$4.95
8 oz.	Brown Glass, "Alcohol"	E39,300	$4.95

STAINLESS STANDARD PUMP TOP DISPENSERS

Dish type pump top dispenser fabricated from stainless steel with hinged lid.

2 oz.	Frosted High Density Polyethylene	E39,301	$9.95
4 oz.	Frosted High Density Polyethylene	E39,302	$9.95
6 oz.	Frosted High Density Polyethylene	E39,303	$9.95
8 oz.	Frosted High Density Polyethylene	E39,304	$9.95
4 oz.	Metal Can	E39,305	$9.95
4 oz.	Amber Glass	E39,306	$9.95
2 oz.	White Porcelain	E39,307	$14.95
4 oz.	White Porcelain	E39,308	$14.95
6 oz.	White Porcelain	E39,309	$14.95

STAINLESS PURITY PUMP TOP DISPENSER

Dish type pump top dispenser fabricated from stainless steel with precision valve to prevent fumes escaping and to prevent fluid pumped into the dish from dripping back into the bottle. Liquid in bottle remains clean and uncontaminated. Hinged lid protects dish when not in use.

2 oz.	Frosted High Density Polyethylene	E39,310	$10.95
4 oz.	Frosted High Density Polyethylene	E39,311	$10.95
6 oz.	Frosted High Density Polyethylene	E39,312	$10.95
8 oz.	Frosted High Density Polyethylene	E39,313	$10.95
4 oz.	Metal Can	E39,314	$10.95
4 oz.	Amber Glass	E39,315	$10.95
2 oz.	White Porcelain	E39,316	$15.95
4 oz.	White Porcelain	E39,317	$15.95
6 oz.	White Porcelain	E39,318	$15.95

SPOUT TYPE LOTION/SOAP DISPENSERS

Polypropylene spout type pump top dispenses a stream of liquid with each touch. Pump with special stainless steel parts will not drip or clog.

4 oz. Frosted High Density Polyethylene	E39,290	$ 3.95
6 oz. Frosted High Density Polyethylene	E39,291	$3.95
8 oz. Frosted High Density Polyethylene	E39,292	$ 3.95
8 oz. Amber Glass	E39,293	$3.95
4 oz. Porcelain	E39,294	$10.95
6 oz. Porcelain	E39,295	$10.95

MINIATURE VACUUM CLEANER

Designed to remove minute particles of dust and debris from hard to reach places. Unlike compressed air which simply disperses pollutants. Powerful mini-vac vacuums them away. Equipped with two interchangeable wands, two fine bristle brushes and a cloth vacuum bag. Powered by a single nine volt battery. Perfect for delicate areas such as cameras, lenses, negatives and slides. 5-1/8" long and 1-1/4" in diameter. Vacuum and blower capability.

Mini-Vac E33,806 $24.95
AC Adapter E38,447 $12.00

NEW! DUST-OFF® PLUS

- **360° Vector Valve®**
- **Safe For The Environment**
- **EPA Approved**

Patented 360° multi-directional Vector Valve® delivers moisture-free power blasts to hard-to-reach areas. Nozzle not only moves up and down 180°, but also sweeps in full 360° circles. Environmentally-safe formula delivers 70% more blasting power. Propellant: 100% HCFC22. This gas incorporates a hydrogen atom which allows it to decompose before it reaches the atmosphere. 12 ounce canister. Contents under pressure.

Dust-Off® Plus With 360° Head E38,713 $39.95
Refill Canister E38,714 $9.95

TOP QUALITY OPTICAL LENS TISSUE CLEANS WITHOUT SCRATCHING

• Traditional Mil-Spec Tissue

Ultra-lightweight, porous, soft anti-tarnish medium. Use for dry cleaning or with alcohol-based solution to polish surface of mirrors, optical parts, coated metals and glass; to wipe coated primary mirrors free of particulates prior to laser scanning. Meets Type 1, Class 1, Physical and Chemical Properties, Fed Spec NNN-P-40B. 500 sheet packages.

7-3/4" x 4" E60,375 $9.50
7-3/4" x 10-3/4" E736 $19.50

New Wet Strength Tissue

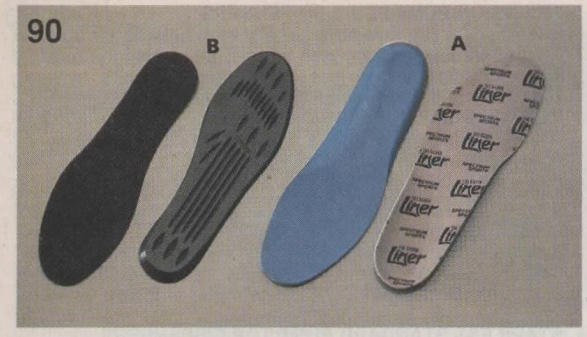
Lightweight, porous, wet strength medium with good strength-to-weight ratio. Suited for use with mildly acidic and alkaline media; non-abrasive, pliable, and absorptive for wiping, wrapping optical assemblies, cathode ray tubes, precision components. 500 sheet packages.

9" x 9" E36,331 $17.95
12" x 12" E36,332 $29.95

Pro-Tech Pre-Formed Lens Tissue

Pre-cut, jointed discs of porous, soft lens tissue which fold to cover both surfaces of a lens. Ideal for cleaning or protective packaging. Package of 500.

66mm E36,334 $14.95
76mm E36,335 $14.95



SORBOTHANE™ REPLACEMENT LINER INSOLES

A) Silver Liner™:
Extend the life of your shoes with a superior and affordable polyurethane & latex replacement sole. Contoured heels and arch supports provide rear foot stability, shock abosrbency and superior fit. Polyester coverings "breathe" for cool, long wearing comfort. Fits any shoe, simply trim to fit. **$9.50 Each Pair**

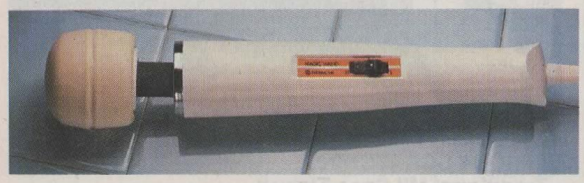
B) Sport Sole:
Sorbothane Sport Sole Inserts are 40% lighter than the regular sole. Provide excellent protection from a variety of running ailments. For the competitive athlete. **$18.95 Each Pair**

Size (Men)	Size (Women)	Silver Liner™ $9.50	Sport Sole $18.95
5-6	7-1/2-8-1/2	E37,151	E37,157
6-1/2-7-1/2	9-10	E37,152	E37,158
8-9	10-1/2-11/-1/2	E37,153	E37,159
9-1/2-10-1/2	12	E37,154	E37,160
11-12	n/a	E37,155	E37,161
12-1/2-13-1/2	n/a	E37,156	E37,162

SOOTHE TIRED MUSCLES WITH INFRA-HEAT™

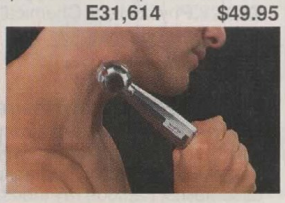
Infra-Heat™ provides deep, infrared heat that penetrates the skin surface to produce a soothing, comforting effect upon the nerves, often the cause of unpleasant, painful sensations associated with arthritis, bursitis, backache, tennis elbow and muscle pain. Infra-Heat™ is therapeutic and emits infrared heat by use of a special lamp bulb and red-colored filter cap. Black and beige unit is constructed of durable ABS plastic. Measures 6"x3". Contoured handle. High/low position heat. UL approved. 120V. 5W bulb.

Infra-Heat™ E36,797 $29.95
Replacement Bulb. 120V. 5W E36,798 $5.50
3 or More, $5.00 Each Bulb



MAGIC WAND MASSAGE VIBRATOR

Personal massage in your own home. Sculptured plastic handle. Soft, washable foam head cover. Surface generated gentle pulses of massaging action. Two speeds. 12"x2" (2-1/2" diameter head). E31,614 $49.95



SOUND WAVE MASSAGER

Novafon emits 10,000 pulses of sound per second to bring soothing, penetrating relief to tired muscles. Produces mixed frequency intra-sound waves in the 200-8,000 Hz range which penetrate 2-1/4" into body tissues. 14V soundhead. Comes with disc-type and ball shaped massage heads. 14" coiled cord. 7-1/2" long. 110V-AC. Weighs 8 oz. E35,408 $189.00

ORAPIK POCKET PIK FIGHTS TOOTH DECAY

Removes food lodged between teeth without aggravating gums. Eliminates plaque. Dentist tested. Convenient pen cap allows you to carry Orapik in shirt pocket or purse.

Orapik E34,556 $15.95

AN EASY WAY TO FLOSS

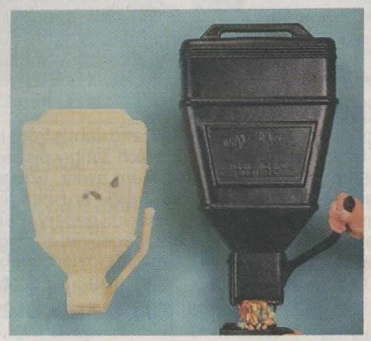
Patented dental care device dispenses dental floss. Space-age acrylic flosser comes with wall holder, 80 yards of bonded, unwaxed dental floss & dental health book.

Blue E34,075 $9.95
Red E34,076 $9.95
Dental Floss Refill (320 yards) E34,184 $8.50

CRUSH-A-CAN

Can Cycler flattens aluminum cans to about one inch. Just pull the lever. Help to promote a cleaner environment. Mounts easily on a wall. Rugged construction.

Two models to chose from.
Measures: 13-1/2"x4- 1/2"x4-1/2".
Plastic Model E31,646 $18.95
All Steel Model E35,278 $32.95



DISPENSING BINS

Wall-mounted bins store and pour dry bulk material. Heavy gauge polyethylene keeps moisture and bugs out. Perfect for pet foods, soaps, fertilizer, more. With dispensing cup and mounting screws.

Big Bin. 16" x 10" x 25" E33,174 $27.95
Lil' Bin. 13" x 8-1/2" x 18" E34,546 $22.95

HOME PROJECT PLANNERS

• Visualize almost any project around the home before you start your project.

Four different Designer Kits developed by a noted architect to help do-it-yourselfers and professionals to create plans for up to 5,300 sq. ft. of interior living space and a half acre of landscaping. Complete with a scale ruler and hundreds of peel and stick, 1/4" scale symbols representing furniture, building components, trees, etc. Symbols easily moved and re-used. Includes a grid board layout surface, an illustrated design manual and storage/work tray.

1) Interior/Home Designer: For the home interior. . symbols for walls, appliances, furniture, windows, doors, etc. **E38,677 $17.95**

2) Deck Designer: Design an outdoor deck. . . includes symbols for different decking, patio furniture, pools, railings, etc. **E38,675 $17.95**

3) Landscape Designer: Layout a half acre of outdoor living space. . . symbols for patio furniture, lighting, surfacing, pools, patio, deck, bushes, trees, etc. **E38,678 $17.95**

4) Kitchen Designer: Three-dimensional planner, left and right view. . . symbols for cabinets, doors, appliances, doors and windows. **E38,676 $17.95**

GENUINE ARMY AMMO BOXES

Ideal for tools or gear. Originally made to hold 200 NATO 7.62mm cartridges. Heavy gauge steel construction with welded seams. Hinged removable top has carry handle and pressure clip closure. Hermetically sealed by a rubber gasket. Green. Measures 3-1/2"W x 10"L x 7"H. Used but good condition.

Set of 2 Ammo Boxes E36,806 $14.95

ELECTRONIC PEST REPELLERS

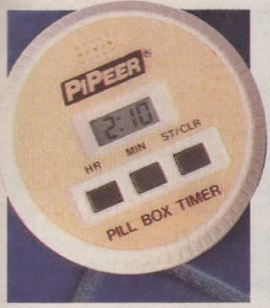
Transonic™ systems emit ultrasonic sound waves to disrupt the nervous systems of pests. Ecologically clean and safe, Transonic™ systems don't kill pests, simply drive them away.

A) Portable Pest Repeller. Lightweight, 3-way electronic operation works on household AC, 12V automotive DC (cord incl.) or 9V battery (not incl.). Umbrella of protection covers 500 to 800 sq. feet outdoors and 1,000 to 1,500 sq. feet indoors. Proven effective against fleas, silverfish, palmettos, cockroaches, mosquitos, wasps, moths, spiders, mice and bats. 6 oz.; 4-1/2" x 2-1/2" x 1-1/2", black.

Small Pest Repeller E33,610 $42.95

B) Heavy Duty Pest Repeller. Powerful multi-function electronic system effectively repels insects, rodents and birds. Vinyl-clad metal case assures years of maintenance-free protection. Comes with 110V AC adapter for use with household current. Protection ranges from 2,000 to 10,000 sq. feet, depending on frequency. Proven effective against all pests listed with portable model, plus rats, squirrels, birds and raccoons. Applications in homes, businesses, farms, restaurants, storage units. 6"x4"x3". Gray painted steel finish.

Heavy Duty Pest Repeller E33,611 $99.95



THE PILL TIMER
• Three Alarm Times

An easy to use alarm that you program to beep every 4,8,12 or up to 23 hours and 59 minutes, or any time in between. To ensure you're fully alerted, two preliminary alarms will sound at 5 and 10 minutes before the time is up. It will automatically reset itself and start counting down from the previously set time. Store pills in two separate compartments. Easy to read liquid crystal display with auto shut-off. 2-3/4" diameter x 3/4"Thk.

Pill Timer E37,450 $14.95

THE SUPER WARMER™ BLANKET
• Your Own Reflected Body Heat Keeps You Warm

This amazing blanket lets you sleep without heavy blankets or costly electric blankets. Constructed of an insulating material developed originally to keep the astronauts warm while in space. This fabric traps, reflects and recycles your own body heat and moisture. Ten times warmer than a wool blanket, yet light as a feather and soft to touch. Rugged, washable. Sized large enough to protect two people (72"x60"). Many applications.

Super Warmer™ Blanket E38,376 $28.95

DIGITAL JOGGING METER RECORDS DISTANCE RUN

Accurately records your mileage up to 99.9 miles, advances in 0.1 mile increments. Calibrated to measure jogging or running. Stride adjustable from 3 to 7 feet. Features reset button, belt clip, 3/16" digit display, shock resistant case 2"L x 2"W x 1"T, lightweight design (only 1.5 oz.), and full instructions.

Jogging Meter E33,890 $19.95

CUSHIONS FOR CRUTCHES

These cushions are designed & developed by a man who has used crutches for more than 35 years. He has found that long-term use of crutches can destroy shoulder joints, and hard ordinary crutches don't offer much protection. That's why he developed these shock-absorbing crutch tips containing a steel disc that spreads the load over a core filler of special shock-absorbing polymer. The soft core allows the tip to twist & bend, eliminating any grinding action. Reinforcing nylon mesh is bonded to the walls for added strength & endurance. The deep concentric circular bottom is designed for positive traction & extremely long wear. The ribbed socket accommodates most crutch sizes.

Crutch Tips (One Pair) E38,895 $26.95

PRECISION DOCTOR'S OFFICE SCALE

Designed specifically for the medical profession by Seca, West Germany's leading producer of precision scales. Provides true weight readings to within one-half pound. Maximum 330 pound capacity. Measures 4"x11"x18-1/2". Steel base with an oversized platform. No-chip, no-rust baked enamel finish. No skid mat. Large 8" diameter dial has both pound and metric scales.

E36,784 $139.95

FOR WATER YOU KNOW IS SAFE TO DRINK

H_2Ok portable water treatment unit improves water quality. Unique bacteriostatic filter allows water filtered through unit to be stored without refrigeration. Small (9") and lightweight (10 ounces). Treats up to 2,000 gallons of water. Filter media inhibits the growth of bacteria.

H_2Ok E35,413 $31.95

AUDIO RELAXATION TAPES

A) The Effortless Way to Improve Your Lifestyle!

Listen to the soothing crash of ocean surf... and simultaneously you'll be listening to a subliminal message. You'll begin to relax as you rest, the self-improvement change you seek will begin in your mind. 12 different opportunities to a more rewarding life. 30Min.Cassettes. **$10.95 Each**

Concentration	**E34,153**
Study Habits	**E34,156**
Creative Thinking	**E34,154**
Money Prosperity	**E34,158**
Relaxation	**E34,159**
Stress Relief	**E34,160**
Self Confidence	**E34,161**
Stop Smoking	**E34,163**
Weight Loss	**E34,164**
Enthusiasm Development	**E34,155**
Memory Improvement	**E34,157**

C) Create The Alpha State

Clicking vibrations, low-pitched droning, environmental sounds and random guitar are combined to create an Alpha state for listener to be drawn into. Helps slow the heartbeat, lower blood pressure and put listener in a state of total relaxation. With handbook. 30 mins. each side.

The Alpha State E35,501 $14.95

B) Relax With "Environments" Cassettes!

Create your own atmosphere. Replicate the magic and splendor of nature. Used by NASA aboard Voyager to help accurately represent Earth's sound. 30 minutes each side. **$9.95 Each**

Slow Ocean	**E42,757**
Thunderstorm	**E42,759**
Sailboat	**E42,761**
Caribbean Lagoon	**E37,630**
Night In The Country	**E42,758**
Country Stream	**E37,631**
Heartbeat	**E37,633**
Gentle Rain In A Pine Forest	**E37,634**
English Meadow	**E42,760**
Intonation	**E37,635**
Summer Cornfield	**E37,636**
Okefenokee Swamp	**E37,637**
Alpine Blizzard	**E37,639**
Country Thunderstorm	**E37,638**
Wind In Trees	**E37,632**

D) Relax And Enjoy Astral Sounds

Hour-long cassette of subtly stimulating computer-generated sound waves helps lessen stress and boost energy. Sound waves cause vibration in the ear's small bones, putting listener in a total relaxed state. Used in hospitals, labs and biofeedback centers. 30 minutes each side.

Astral Sounds E31,466 $14.95

ANTI-FRANTIC TAPES

A new form of exquisitely beautiful music created by Steven Halpern, Ph.D. to soothe your mind and uplift your spirits. Music to enhance that part of us which is naturally tranquil. Used in hospitals, clinics, businesses and homes.

Each Tape $13.95

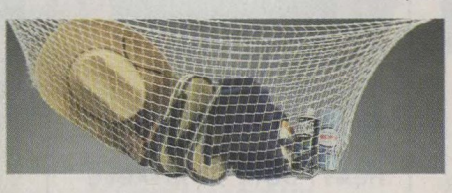
Spectrum Suite: 7 selections from electric piano, flute, cellos, string ensemble, special effects. **E31,592**

Dawn: Tapestry of flutes, grand piano, lyricon wind synthesizer and electric piano. **E37,465**

Comfort Zone: Orchestrated on keyboards and softly sustained strings. **E37,466**

Eventide: Inspired by the changing textures of a California sunset **E37,467**

Letting Go Of Stress: Four highly effective techniques for relaxation and stress reduction. **E37,468**



ALL PURPOSE STOW-AWAY GEAR HAMMOCK

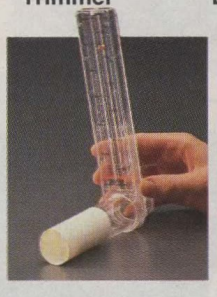
This multi-purpose, all-nylon gear bag is designed like a hammock. 48"Lx16"Deep. Stow gear on boats or in your garage. Folds to fit into car or truck glove box. Rugged. Washable. Tested to hold 80 pounds. White nylon. **E34,874 $6.50**

Two or More Hammocks $5.95 Each

CORDLESS ELECTRIC TRIMMER

Removes unwanted hair from hard-to-reach areas (such as nose, ears and eyebrows). Contoured to follow the curves of the face without irritation. Powered by two "AA" batteries (incl.).5-3/4" x 2-1/2".

Trimmer E31,621 $17.95



RESPIRATORY PEAK FLOW METER

Evaluates respiratory status over a flow range of 80 to 650 lpm efficiently and inexpensively. Accurately documents effectiveness of medication. For home, office and hospital.

Peak Flow Meter E35,305 $29.95

THERMAL MUG

Your drinks stay icy cold or steaming hot with our insulating dewer type thermal Stainless steel mug. Keeps beer, soft drinks and juices icy cold for up to three hours. Insulating cap to seal in the temperature. Holds up to fourteen ozs.. Can also be used as a cryostat to hold ice water or dry ice.

Thermal Mug E72,347 $28.95

A. FM ANTENNA AMPLIFIES SIGNAL 18 TIMES

Indoor omnidirectional FM antenna amplifies incoming signal up to 18 times. Precision printed electronic circuits capture and amplify normally hidden weak signals, boosting reception and the number of stations your receiver can pick up. Eliminates multiple interference. 0-24dB adjustable gain signal amplifier. Black ABS plastic antenna stands 16-3/4". 2-1/4" x 3-1/2" base. Plugs into any stereo FM antenna input and 110V outlet.
Amplification Frequency Range: 50 - 150 Mhz (with optimal amplification from 88 to 108 Mhz).
Distortion: Less than 60dB with output of 100mV (less than 1/1000 of a signal at 100mV).
Noise Figure: 3dB (1mV). **Stationary Wave Ratio:** Less than 1.2
Impedance: 75ohm. Adaptable to 300 ohm input with matching transformer.

FM Antenna **E34,352** **$79.95**

B. PARSEC STEALTH ENERGIZED FM ANTENNA

The first energized FM antenna made to be heard, not seen. The Stealth was designed to hide behind stereo rack of component systems without loss in performance and sensitivity. The exclusive, patent-pending GaAsFET circuitry provides ultra-low noise amplification and variable output gain enabling the user to maximize signal strength when receiving weak stations and to minimize noise when receiving strong stations. Reception is omnidirectional when mounted vertically and directional when mounted horizontally.
Frequency Reception Range: 88MHz - 108MHz
Pick-up: Omnidirectional when vertical, directional when horizontal
Output Impedance: 75ohm "F" type connector (300ohm matching transformer provided)
Amplifier Gain: 32dB minimum **Background Noise:** Less than 1.5dB
Adjacent Band Rejection: Greater than 26dB
Intermodulation Distortion: Less than 0.08% at 100mV
Power Supply: UL and CSA listed 12V DC , 50mA for use with 117V AC **E38,913** **$54.95**

SELECT-A-TENNA • AM/AM Stereo Reception Booster

Select-A-Tenna is the remarkable AM radio signal booster that requires no connection to your receiver — simply requires placement nearby. No connections, no batteries, no AC power. It's already working as received in the carton. Select-A-Tenna improves and lowers signal-to-noise ratio, especially with the new AM stereo - for greater fidelity. Select-A-Tenna raises lost signal-to-noise ratio by increasing the signal without significant noise, while improving AM stereo enjoyment. Select-A-Tenna was designed specifically for very poor AM radio reception areas. Many regions of the earth have been short-changed with low electrical conductivity of the geological structure. This results in poor signal propagation from broadcast station to receiver. Select-A-Tenna boosts all tuned signals equally, weak or strong, but the performance is particularly spectacular in poor reception areas because all stations on the dial exhibit the full effect of the boost. Select-A-Tenna performs by creating a strong localized radio frequency energy "well" in the space immediately surrounding the device. Placing your receiver in this same energy "well" results in a stronger received signal.
Power Requirement: None **Dimensions:** 10-3/4" Dia. x 2-1/4" Wide **Weight:** 2 lbs. (0.9 kg.)
Tuning Control: One, continuously variable **Frequency Range:** 535 khz to 1600 khz
Radio Interface: No direct connection. Near proximity field effect gain +30 decibels typical at mid-band. Depends slightly on receiver antenna size and frequency.

Select-A-Tenna **E72,147** **$54.95**

DYNAMO HAND CRANK RADIO/ FLASHLIGHT

• No Batteries or Plugs

Self-contained, hand-cranked generator ends the fret over dead batteries or power outages when an emergency strikes. A crank of the handle provides a long-lasting blast of light. AM/FM radio provides source of emergency information. Handy even without an emergency. With DC adapter and spare bulb. High-impact plastic. Built-in antenna.
Dynamo Radio **E35,420** **$49.95**

FOLDING SPEAKERS TURN ANY PORTABLE PERSONAL STEREO INTO A DESK TOP SOUND SYSTEM

• Fits In a Shirt Pocket

Compact and easy to carry. Closed, they measure only 4" x 2-1/2" x 1"; open up to 8" x 2-1/2" x 1/2". Speakers plug into a headphone jack. The 24" connecting cord serves as an FM antenna.
Mini Speakers **E33,065** **$19.95**

MAGNUM 95FM "POWER SLEUTH" FM ANTENNA SIGNAL AMPLIFIER

• Brings Distant FM Stations to Your Doorstep

The "PowerSleuth" provides clean signal amplification of 30dB (30 times the input signal), pulling in distant FM stations you might never have known existed - up to a 300 mile radius. This unit is fully tunable with adjustable signal gain to help control both adjacent station and multipath interference. The Power Sleuth is useful in both city and remote areas. 300 ohm 'twin lead' antenna input/output. Woodgrain cabinet with black anodized face plate. Weighs 4 lbs. **E31,918** **$179.95**

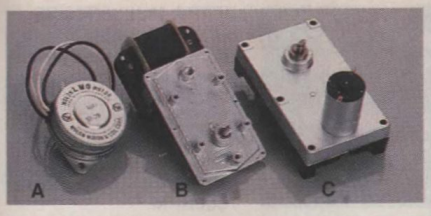
HEAVY DUTY TURNTABLE

Measures 18" x 24" x 3/4" with 12 inch diameter ball bearings that hold objects weighing up to 1,000 lbs. Ideal for typewriters, monitors, home computer terminals, sewing machines and much more. Simulated wood finish. **E31,789** **$47.95**

PRIVATE WAVES

• Wireless Headphones

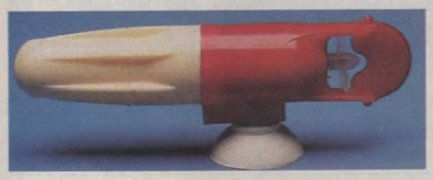
Wireless headphones let you enjoy the private listening pleasure of your favorite TV, VCR and music programs anywhere - in or around your house - without disturbing others. You can even work or relax outside and listen to any type of programs being broadcast from inside the house. Unit includes the base station, receiver with belt clip, headphones and AC adapter.
Operating Voltage: Base station 12VDC (from adapter); Receiver - 2 "AAA" batteries (not included).
Frequency Response: 80Hz = 15KHz
Operating Distance: Up to 75 ft. depending on conditions.
Wireless Headphones **E38,467** **$99.95**



A) A.C. MOTOR
120V, 60HZ, 300 RPM, 12W, reversible. Four 6" leads. Housing is 1" thick, 2-1/4" Dia., plastic drive gear 3/8" Dia. Made by Molon, 8 oz. Condition used, good.
E38,641 $4.95

B) GEAR MOTOR
5 RPM gear box housing 4-5/8"L x 2-11/16"W x 7/8" THK. 6 mounting holes. Housing 1-3/4"L x 1-1/16"dia. with 2 solder type tabs for leads. 2 shafts 5/16" dia. x 3/8"L. 1.5 lbs. Condition new.
E38,658 $5.50

C) MOTOR DRIVEN GEAR BOX
12V DC, 5 RPM gear box housing 4-5/8"L x 2-11/16"W x 7/8" Thick. 6 mounting holes. Motor housing 1-3/4"L x 1-1/16" dia. with 2 solder type tabs for leads. 2 shafts 5/16" dia. x 3/8"L. 1.5 lbs. Condition new. **E38,640 $14.95**

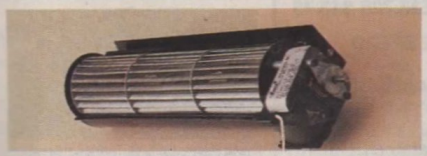


MABUCHI SUBMARINE MOTOR
Power boat models or any floating toy by attaching this submersible Mabuchi motor directly to the bottom with suction cup or glue. Powered by one "AA" battery (not included), internal motor turns a small 2 blade propeller, adjustable rudder. Overall length 4-3/4" x 1" diameter.
Submarine Motor E39,289 $3.50

BATTERY HOLDERS
All holders are made from spring-tempered aluminum with two pre-drilled mounting holes and polarity identification markings (+-). Battery contacts are nickel plated brass. Wire contacts are solderless clips (Fahnstock-type). Batteries not included.

Holder Type	Number of Batteries Held	Volt age	Stock Number	Price
D	One	1.5	E38,794	$2.95
D	Two	3	E38,795	3.45
C	One	1.5	E38,796	2.25
C	Two	3	E38,797	3.25
AA	One	1.5	E38,798	1.95
AA	Two	3	E38,799	2.95

MABUCHI "PENCIL" MOTOR
Barely larger than a pencil, this miniature permanent magnet motor runs at 9,500 RPM with one 1.5V "AA" battery, current with no load 90 mA. Motor dimensions 3/4"L x 1/2" dia., shaft dia. 0.059" x 0.35" Long. Battery holder attaches directly to motor (battery not included). Overall length 2-7/8"L. Comes with miniature propeller.
"Pencil" Motor E39,281 $2.95

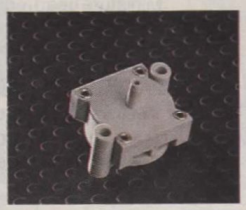


SQUIRREL CAGE FAN
Originally designed for use in recirculating "wasted" wood stove heat. Operates on 115VAC and draws .90 amps. 1/60HP. 2800 RPM. Overall length 14"; Cage length 11". All metal construction. Weight 3-1/2 lbs. Used but in good condition.
Squirrel Cage Fan E38,636 $14.75

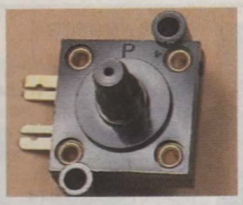
MABUCHI MINIATURE MOTORS
• Double Permanent Barium Ferrite Magnets
• Perma Tension Brushes
• Sturdy, Sealed Metal Cases • Oilite Bearings • Low Drain
Mabuchi Cer Mag motors embody the latest developments in D.C. motor design. They feature an amazingly high power to weight ratio, low drain and high R.P.M. New interior design features result in constant R.P.M. with a minimum of friction power loss. Mounting bases removable by unscrewing.

SPECIFICATIONS:

Voltage Range	1.5-3.0	1.5-3.0	1.5-3.0	1.5-4.5	4.8-12.0	4.8-12.0	4.8-12.0
Nominal Voltage	1.5	1.5	3.0	3.0	7.2	7.2	7.2
Normal Load - Oz./In.	.080	.091	.210	.260	3.47	4.17	6.94
- G./CM.	5.8	6.5	15.2	18.5	250.0	300.0	500.0
RPM At No Load	8600	7600	11,600	9,200	15,000	11,500	13,100
RPM At Nominal Load	6000	5200	8,300	6,750	13,000	10,000	11,000
Current At Nominal Load	320mA	270mA	250mA	100mA	7.5A	6.5A	11.0A
Shaft Diameter	.078	.078	.078	.078	.1248	.1248	.1968
Overall Length	1.50"	1.50"	1.50"	1.77"	2.64"	2.95"	3.43"
Motor Body Length	.98"	.98"	1.06"	1.20"	1.97"	2.25"	2.36"
Diameter	.79"	.83"	.94"	.94"	1.41"	1.48"	1.66"
Stock Number	E39,282	E39,283	E39,284	E39,285	E39,286	E39,287	E39,288
Price	$2.50	$2.50	$2.98	$2.98	$11.95	$14.95	$19.95

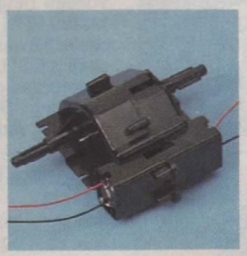


ULTRA SENSITIVE .004 PSI AIR PRESSURE SWITCH
Made by MicroPneumatic Logic (MPL#502) this ultra sensitive pressure switch is rated at 20mA at 120VAC with .004 PSI sensitivity. Glass filled polyester body is 1" square x 3/8" thick (1/2" thick with mount). Port accepts 1/8" inside diameter tubing. Mount accepts two 1/8" diameter bolts/screws. Switch contacts are single pole, normally closed. Closes in 1/10" of water. 10 million cycle life. Weighs 1/4 oz.
Air Pressure Switch E36,839 $14.95
10 or More, $13.95 Each



0.02 PSI SENSITIVE AIR PRESSURE SWITCH
Gold inlay switch contacts are single pole normally open and rated at 10mA @ 30VDC. Ports accept 1/8" inside diameter tubing. 1" square body. 5/16" thick. Polycarbonate case. 10 million cycle life. Weighs 20 grams.
Air Pressure Switch E41,623 $15.95
10 or More, Each $14.95

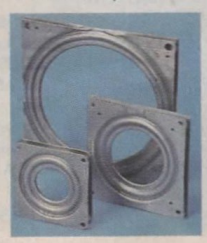
22,000 RPM HIGH TORQUE RACE MOTOR
Originally designed for R/C race cars, this compact permanent-magnet motor is ideal for applications requiring high RPM. Supply voltage is 7.2-8.4 volts. The 3-pole rotor is dynamically balanced by hand. Estimated running time, loaded (R/C car) with a fully-charged (1200 MAH) Ni-Cad battery is 8 minutes. **Dimensions:** 2.25"L x 1.40" dia. overall; shaft 0.125" dia. x 0.30"L (with one flat face).
Race Motor E38,764 $13.50



DUAL DRIVE, DUAL CONTROL ROBOT STEERING MOTOR
Two 1.5 to 6 volt DC motors in a single housing. Each drives a separate 3/8" dia. x 1-1/4" output shaft. Output shafts are sychronized by magnetic differential coupling with stoppage when load on one shaft is more than the other. 6VDC, 150 input polarity to motor. 16oz. inch torque capacity with higher torque on a momentary basis. Duty cycle intermittent. Plastic gearbox. 5" x 2-2/4". 2 lbs.
Robot Motor E31,827 $4.95 3 or More, $4.25 Each

1) **Single Pole and Throw** , 1-1/2"x 1", 1/2" Spacing. **E38,805 $2.10**
2) **Single Pole, Double Throw,** 2-5/16" x 7/8",7/8" Spacing. **E38,806 $2.30**
3) **Double Pole, Single Throw,** 1-1/2" x 1-1/2", 1" Spacing. **E38,807 $2.70**
4) **Double Pole and Throw,** 2-5/16" x 1-1/2", 7/8"Spacing. **E38,808 $2.90**

KNIFE SWITCHES
Sturdy plastic base knife switches with screw terminals for low voltage electrical experiments.



BALL BEARING LAZY SUSANS
Heavy gauge zinc-plated steel, pecision balls, deep races, 5/16" thick. Screw holes offset so load bearing sections clear each other.

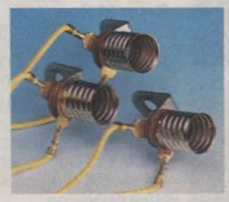
Number	Plate Size	Center Hole	Table Size	Load Lbs.	Wt. Ozs.	Price
E40,600	3" sq.	1-9/32"	18"	200	3-1/2	$2.50
E40,601	4" sq.	2-1/8"	25"	300	6	$3.00
E40,602	6-1/8" sq.	4-11/16"	30"	500	10	$4.00
E60,327	12"rd.	6-5/16"	60"	1000	30	$6.75

HIGH POWER AIR PUMP
120V, 60 HZ, 20W. AC outlet adapter. Outlet port is 1/2"O.D. -1/3I.D. 3-1/2" x 3-1/2" x 3-3/4". Blows strong steady air for continuous use. 3lbs.
E38,690 $17.95

9 VOLT AC/DC BUZZER
1-3/4" diameter x 1"H. Comes with 2" leads ready for 9V AC. By adding third wire to the case, buzzer operates on 9VDC.
E39,094 $3.50

500 SPRINGS
Variety of industrial quality metal torsion, extension and compression springs. Save many times the single spring price by buying in bulk.
E34,767 $16.95

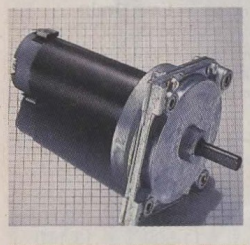
4 BALL BEARINGS
2 black Delrin housings, 1-19/32" diameter and 1-7/32"L. Each are 2 bearings and a 3/16" thick spacer. 2 white Delrin, 1-3/8" O.D.; 5/8" I.D.; 7/16"T.
E35,737 $4.95
ES Sale $2.95



MINIATURE LAMP SOCKETS
Holder for 3 volt D.C. screw-base single contact bulb with right angle mount and two 6" leads.Pkg. of 4.
E38,793 $2.25

SWITCH KIT
35 in all. Assortment of dip, toggle, slide & sensitive switches in miniature and standard sizes. New condition.
E35,762 $17.50

SOLENOID VALVE
12VDC valve is handy for low volume, low pressure air or water uses. Designed for automotive applications. Works with gravity flows and automatic level controls.
Package of 2 E42,533 $3.95

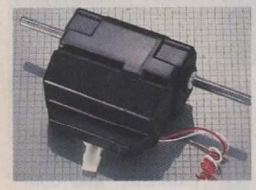


PERMANENT MAGNET BEVEL FIELD GEARHEAD MOTOR
Rated 95 RPM, 0.5 Amps no load at 36 VDC, Torque 12 lb.—in max. at 65 RPM, 1.2 Amps at 36 VDC. Will operate at lower voltages with reduced speed and torque. End mounts at gearbox end with four 10/32 tapped holes. Output shaft double flatted 5/16"dia. x 1" L. Sizes: Gearbox 3-1/4" x 3-1/4" x 1-15/16"; motor 1-1/2" maximum diameter x 3-1/2" L with 0.187 male quick connect terminals. New condition. 1.5 lbs.
E38,464 $16.50

14V 3AMP SPLIT SERIES MOTOR
This 13,500RPM motor features sintered bronze bearings and a steel thrust blade. Also has a 1/2" diameter shaft and 16 gauge wire leads. 4" long. Weighs 1-1/2 pounds.
Split Series Motor E61,085 $8.75
3 or More, $7.75 Each

48 MABUCHI MOTORS BARGAIN
Package of 48 new miniature, permanent magnet-type motors. Body 1-1/4 " L x 1" W x 3/4" H. Flat top and bottom with curved sides. Shaft .075" Diameter x 1/2" L. 3.0V to 6V DC. Motor has external contact pins with small hole.
Great bargain!
Pkg. of 48 Motors E37,647 $21.95

HEAVY-DUTY CEILING MOTOR
10 lb. motor revolves at a steady 4RPM. Black metal case; mounting flange; drive shaft hole; uses 115VAC; 2- 9/16"H.
Ceiling Motor E60,744 $42.95



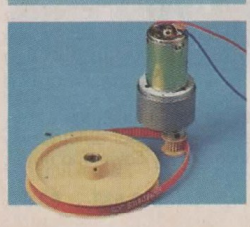
REVERSIBLE DC GEAR MOTOR
6VDC geared motor, 20RPM. Features forward, reverse and off, controlled by manual lever-type switch. Two steel, cadmium plated shafts, each 1/4" dia. x 1-1/2" Long. Low torque. 5" leads. Plastic housing 1-3/4" W x 2-1/2" L. Weight: 6 oz. Surplus, new condition.
Gear Motor E38,448 $8.50

PERMANENT MAGNET MOTOR
12VDC, reversible motor draws 4AMPs, 2,700RPM. Bronze bearings. Two exposed solder - type connections. Metal housing: 1-7/8" diameter x 2-3/4" long. Two shafts, each 11/16" long x 1/4" diameter. Industrial surplus—new condition—weight 1 lb.
Magnet Motor E37,653 $5.75

MINIATURE DC SOLAR MOTOR
Best and most efficient solar motor we've found yet. Operates from .5V up to 3 volts. At .5V with no load 15mA at .5V stall 100mA strong torque. Great from drives. 300RPM, 5V. Measures 1-3/8" dia. x 1" long. 2 mm shaft dia.
Solar Motor E37,590 $8.50
3 or More, $7.75 Each

REVERSIBLE MOTOR
6 to 12 volts DC. 200mA. Shaft size 5/8" L x 3/32"Diameter. Approximate speeds are 2800 RPM at 6 volts and 6000 RPM at 12 volts. All metal housing is 1-1/8" diameter x 1-3/4" L. Two mounting holes 1/8" dia. Two solder tab-type connections. Weighs 3 oz. New condition.
Reversible Motor E38,639 $2.95

HOSIDEN FAN MOTOR
Hosiden DC motor can be operated between 6 VDC (1000 RPM) and 18 VDC (3000 RPM). It has two 12" x 0.06" color coded leads. Motor size is 1-2/5" x 0.86" and has two unthreaded mounting holes (0.13"diameter) centers spaced 1.5" apart. Shaft is 0.45" x 0.08" diameter. Weight is 1 ounce.
Hosiden Motor E39,093 $3.95

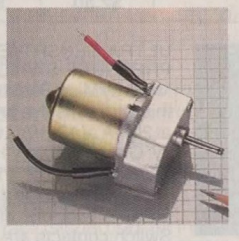


CANNON GEAR MOTOR
12VDC motor with 20" leads. 2.5" x 1.5" dia.body. Shaft is 3/4" x 3/16" in dia. Large serrated pulley: 7/16" dia. with 3/16" dia. center hole with set screw to retain the shaft of the motor. Serrated belt: nylon belt connects the large and small pulley with centers spaced 2-11/16" apart. Large serrated pulley: 3-1/32" dia. with 9/32" dia. center hole.
E39,061 $14.95

MOTORS BY THE BAG
Versatile 1"motors with 3/8" long shafts and two wire leads. Perfect for hobbyists, science fair projects, classroom demonstrations, experimentation, etc. Small cloth sack with drawstring contains 20 mini 1.5 volt battery-powered motors.
Bag of Motors E1304 $14.50

ULTRA-MINI MOTORS
Micro size motors were originally designed to advance the film in disc cameras. They measure only 7/8" long x 11/16" wide x 3/8" high with a 1/16"diameter x 5/16" long shaft. At 3 volts 200mA they will do 7500RPM.
E35,128 Package of 5 Motors $5.75 Each
5 or More of Above Package of 5 $4.15 Each
20 or More of Above Package of 5 $3.40 Each

COMPACT HEAVY DUTY FAN
1.5" x 1.5" x 3/4" fan has 5 blades and 4 unthreaded mounting holes with centers spaced 1-1/4" apart. Operates on 12VDC 250 mA and provides a steady flow of air. All metal housing construction with two 12" leads.
Fan E39,091 $11.95



GEARED MOTORS
Miniature gear-reduction, high torque motors. Output reversible by polarity change of input voltage. Output shafts 1/8" dia. x 1/2" long with 1/2" flat face. Measures: overall 2-5/8" L x 1-3/8" W x 1-1/4" H.

Item	Volts	Shaft Speed	Item	Volts	Shaft Speed
1.5 to 4.5 Volt DC	1.5	5 RPM	1.5 to 7.5 Volt DC	1.5	32
E35,116	3.0	15 RPM	E36,419	3.0	73
$7.00	4.5	25 RPM	$7.00	4.5	140
				6	160
				7.5	200

HOBBY MOTOR ASSORTMENT
16 assorted 6 and 12V, DC and 115V, AC, slow-speed timing and display motors. Tinker with an experiment, power a display, create special effects, etc.
Motor Assortment
E35,763 $17.50

CAGED FAN ASSEMBLY
3 inch diameter fan blade with 115V/60Hz 14W motor, impedance protected. Blade is surrounded by wire cage on sides, open in front with four mounting legs. Cage is 3-3/8" diameter. Two 4" leads.
Fan E36,258 $11.00

SPEED CONTROLLED MOTOR
1" x 2" motor switches off when it reaches speed and on when it slows below threshold. 12VDC unit with 10 to 50 OHM resistor. Permanent magnet provides plenty of torque. Shaft is 3/32" x 1/2". With brass pulley and rubber grommet. 2000RPM.
Speed Controlled Motor E33,601 $4.50
3 or More, $3.75 Each

HIGH SPEED MABUCHI MOTOR
Voltage range 3.6 to 15 volts, DC. 12,000 RPM at 6V. 700mA. 11,300 RPM at 12V. 7.34 AMP. Max. torque 3.87 oz. inch. Output power 32 watts. Dimensions: motor housing 2-1/4" L x 1-7/16" dia.; shaft is 5/8" L x 1/8" dia. Overall length including shaft: 3-5/16". 10-tooth brass gear 3/8" dia. x 9/32" L mounted on shaft. Two 4-40 mounting holes at shaft end. Two solder post connections. 8 oz.
Mabuchi Motor E38,712 $6.75

REVERSIBLE ROBOT DRIVE MOTOR
Inventor's motor designed to be used as a power source for motorized toy. Features forward and reverse switches. High torque motor with drive wheel. Shaft size: 2-43/64", diameter 1/8". 20RPM on 4 "D" batteries. 5-1/2" x 4-1/4".
E72,379 $10.00
3 or More, $9.00 Each

SURPLUS TIMING MOTORS
Six piece assortment of timing motors with various RPM. All have wire leads; some have gears. Excellent for use in projects when only low RPM are required. Great surplus bargain. Operate on 110VAC.
Timing Motor E35,725 $13.75

CANNON VARIABLE SPEED MOTOR
Vary voltage by changing the DC input. Dimensions are 1-1/3" x 1-1/16" dia. Shaft is 1/4" x 5/32" dia. Two mounting holes (.12 in dia.) separated 2" apart.

VDC	RPM
1.5	4
3.0	17
4.5	30
9.0	60
12.0	84

Motor E39,090 $5.95

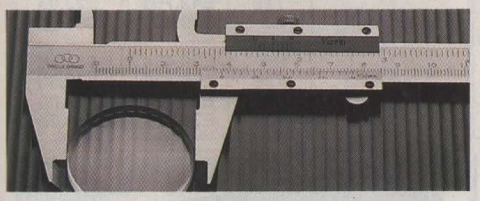
SIGNAL CORPS ALNICO GENERATOR (DC)
Military surplus generator originally used in a field telephone. Generates 55V to 85V unloaded. Can be used in high impedance relays. Includes generator with alnico magnets and large geared crank with handle. 6"L x 4" H x 3" W. **E31,501 $39.95**

SOHO GEARHEAD D.C. MOTOR
Heavy duty surplus 12 volt D.C. motor with 2" leads. 11/16" x 3/16" shaft rotates at a steady 40 RPM 2-7/8" x 1-5/16". Weighs 7.5oz.
Motor E38,916 $14.95

VERNIER CALIPER WITH INSIDE & OUTSIDE JAWS - INCH AND METRIC SCALES

Steel construction caliper can make inside and outside measurements and depth measurements. Graduated 1/16" to 5" and 1 millimeter. Reads to 1/28" and 1 mm. Vernier scale for millimeters has 11 lines enclosing 10 spaces. Inch scale has nine lines enclosing eight spaces. Scale allows the finest divisions on the bar to be subdivided into tenths of a millimeter.

Economy Vernier Caliper **E40,598 $10.50**



PRECISION VERNIER AT AFFORDABLE PRICE

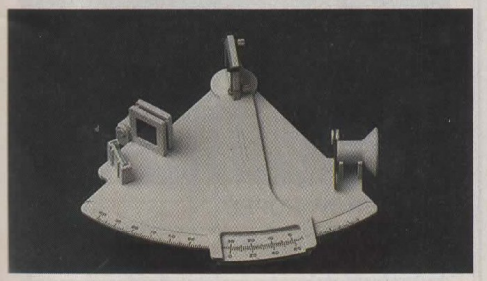
Precision caliper can make inside, outside and depth measurements. Features both inch and metric scales. Inch scale 0 to 6-1/2" in 1/16" increments reads to 1/128 inch. Metric scale 0 to 15cm in 1mm increments reads to 1/20mm Weighs 4.7 oz.

Caliper **E37,575 $42.95**

THE MODERN SEXTANT

The traditional navigational instrument has been brought up to date. Weather-resistant plastic frame with contoured, easy-grip handle. 7" radius, graduated 120 to -5 degrees. Easy to read micrometer drum and vernier. No adjustment wrenches needed. Readings: micrometer direct to 1 minute; 0.2 minute with vernier. Adjustable mirrors have instrument quality glass and baked-on, salt-spray resistant backing. Seven sunshades allow independent shading density adjustment for index and horizon mirrors. Half-silvered horizon mirror. With built-in 3 x 27mm star telescope with coated ground glass optics. Weighs 14.5 ounces. Includes neck lanyard and padded carrying case.

E34,835 **$135.00**

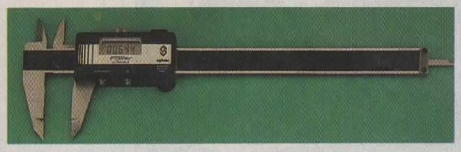


STUDENT MARINE SEXTANT

• Full 7" (178mm) Arc • 4 Sun Shades
• Instantly Adjustable • Corrosion Proof

The result of years of practical experience in the manufacture of precision instruments, this rugged plastic sextant has been used as the sole means of navigating both the Atlantic and Pacific oceans. Enabling the yachtsman to take a ship to any part of the earth, it is used by professional, amateur and student navigators alike. This rugged, full-sized instrument reads to within 2' of arc! A practical learning tool.

Student Marine Sextant **E34,834 $38.95**



SWISS-MADE ULTRA-CAL II WITH COMPUTER PRINTOUT CAPABILITY

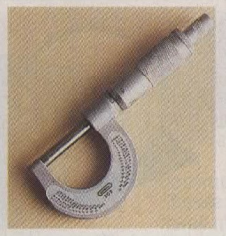
True inch/metric conversion switch. Oil, dust and chip proof. Non-contact linear measuring system insensitive to magnetic and electrical interference. Floating zero. Measuring speed 60" /sec., 1.5m/sec.. One year continuous use from one standard silver oxide 1.5V battery (Type 357, incl.). On/off switch not required. LCD characters 5 mm high. Frame, jaws & depth rod are precision ground, hardened stainless steel. Weighs 5.3 oz.Case.

Ultra-Cal II **E35,303 $225.00**

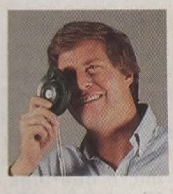
Standard	Range	Resolution	Repeatability	Accuracy	Jaws Outside	Jaws Inside
Inch	0-6"	.0005"	.0005"	.001"	1.6"	.700"
(mm)	0-150	01	01	0.03	40	18

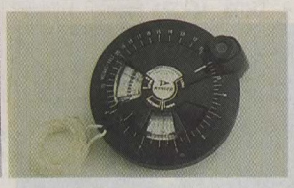
STUDENT ENGLISH MICROMETER

Provides readings in 0.025" graduations to 1" with 0.001" accuracy. Numbered readings every 0.01". Zero adjust. Decimal equivalents on frame. Adjustable anvil. Friction thimble for sensitive pressure. 4-3/4" overall. Perfect for the student.



E60,666 **$22.95**





POCKET RANGEFINDER

Pocket-size stadimetric measuring device measures from six feet to as far as the eye can see. Accurate to within two percent. Provides a direct reading on a slide-type calculator in yards, statute or nautical miles or can be converted to metric. 4" diameter. 1-1/4" thick. Water and corrosion proof. Weighs five ounces. Non-magnetic. With neck strap.

Rangefinder **E34,826 $52.95**

MAGNETIC BASE WITH ADJUSTABLE ARM

75 pound pull "V" construction grips round or flat surfaces. Easy on/off magnetic grip lever release. Base is 2-1/8" H, 2" W. x 2-3/8"L. Post and arm are 7" each. 9-1/2" H. 360° capability. Has magnet built into one side. Universal clamp, 1/4" threaded mount to accept dial indicators.

E35,769 $37.95

Aluminum Spring Dial Indicator.
2" diameter dial is graduated in 0.001" increments. Range 0.001 to 1". **E35,766 $37.95**

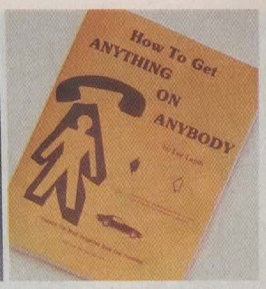
Magnetic Base and Dial Indicator Combination
E35,768 $72.00

MINI COMPASSES

Tiny but highly accurate compasses make ideal and inexpensive premiums and party favors. Metal and plastic compasses are 7/10" in diameter and 1/4" thick. Floating needle. Shows all 32 compass points.

Bag of 6 E40,468 $2.85

1-1/2"diameter x 3/8" Thick Compass **E39,438 $1.50**



SECURITY AND SURVIVAL INFORMATION FROM THE EXPERTS - The Manual

When it came to survival, the Army manual was "The Book" for military troops. This is an exact reprint of the Army Field Manual, Special Forces Operational Techniques. 4" x 5" softcover manual has 535 pages. Well illustrated. Includes chapters on intelligence, psychological operations, infiltration, planning and operations, raids and ambushes, communications, and more.

The Manual **E9711 $18.95**

How To Get Anything On Anybody. Here Is The A-To-Z Handbook On Carrying Out An Undercover Operation

No nonsense book is a must for anyone wanting to learn or sharpen their skills regarding intelligence and surveillance techniques. Book is a consumer's guide to electronic surveillance equipment, detailing the best equipment available. Explains stakeout strategies, how to scramble a telephone conversation, check a driver's license, organize an intelligence campaign and more. Source guide is 268 pages in length. Paperback. Stalk, track and investigate.

Surveillance Encyclopedia **E9664 $32.95**

Catch Up On The Latest In Electronic Surveillance Devices And Applications

Detailed, well researched book explains the latest in surveillance techniques. Learn about telephone room eavesdropping devices, general purpose surveillance protection systems, microphones, wiretaps, tape recording devices and much more. Includes detailed charts and illustrations. 9" x 12" paperback book. 169 pages.

Science of Electronic Surveillance Book **E33,578 $39.95**

FLOATING LENSATIC COMPASS

This pocket lensatic is a compass that excels as a direction finder and it floats. The hairline guide permits you to sight different objects while reading your position in mils and degrees. The revolving dial has four luminous points and reference marks for convenient use at night.

Floating Lensatic Compass
E33,544 $32.95

LIQUID-FILLED ENCAPSULATED COMPASS

Find your way out of the woods using the unique Silva compass system. Clear base plate allows user to plot locations on a map. Features a Swedish steel needle on a sapphire jewel bearing. Luminous directional points for night viewing. Inch/mm scales. 2" x 3" base. Weighs 1 oz. 360° rotating dial. Cord hole. Instructions teach field, bearing, plotting locations, magnetic inclination and declination, map bearing rules, and more.

Compass **E35,269 $13.95**

STROBOSCOPE/TACHOMETER MEASURES RPM

Stroboscope optically stops the motion of any moving object while it is in motion. Tachometer is capable of measuring the speed, or rate, of rotation. Unit serves as an analyzer, measuring device, fault detector.

SPECIFICATIONS:
Flash Rate: 200 to 8000 per minute
Flash Energy Input: .08 joules (watt seconds) typical @ 2000 FPM
Flash Tube Type: Xenon gas filled
Flash Duration: 20 to 30 microseconds typical
Duty: 3 minutes @ 8000 FPM continuous below 4000
Power Source: 110 to 125 VAC or DC, 50/60HZ (22 Watts @ 8000 FPM typ.)
Accuracy: 3% of full Scale
High impact case. Plastic lens. Mirror- type reflector. Built-in 1/4-20 threaded tripod socket. On/off switch. Flash dial.

Stroboscope/Tachometer **E71,500 $149.95**

POCKET ALTIMETER

Shows elevation from sea level to 15,000 feet. Registers in graduations of every 200 feet. 2-3/8" square and 1" thick. Weighs less than four ounces. Has built-in weather barometer to warn you of impending storms. Zero adjust screw on back of altimeter. Black numerals and characters on a silver background. Can be mounted on car or truck dashboard or carry it in your pocket . Zippered carrying case. Mount with hook, 4 screwholes, or double-face tape.

Altimeter **E34,544 $39.95**

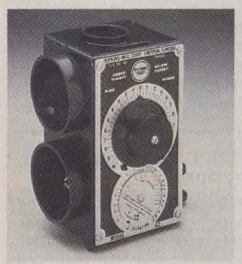
POCKET ALTIMETER/BAROMETER WITH COMPASS & THERMOMETER

This pocket devise has all the necessary instruments in one compact case. Altimeter scale 0 to 14,000 ft. in 200 ft. divisions. Barometer 18 to 30 inches. Liquid filled compass. Thermometer 0 to 140°F. Measures 2-3/4" H x 2-1/2" W x 1" T overall, 2" dial face, 3/4" . Zero adjust screw and leather case. Made in Japan. **E38,067 $69.95**

PROFESSIONAL OPTICAL RANGEFINDERS

Lightweight accurate optical measuring devices designed for professional use in a variety of measuring ranges. All are durable enough to be taken into the field and easy to use. Basic procedure is to spot the subject in the viewfinder, focus the images and read the distance. The entire operation takes just seconds.

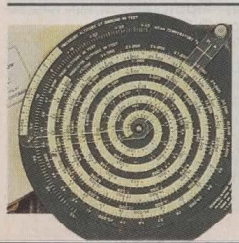
STOCK NO.	E36,682	E36,685
RANGE	15-50 yds.	20-200 yds.
ACCURACY	±1 yd. at 50 yds.	±13.6 inches at 20yds.
DIMENSIONS	5-7/8" x 1-1/2" x 1"	9-15/16" x 3-5/8" x 1-7/16"
PRICE	$49.95	$165.00



SPLIT IMAGE TRANSIT

An economical alternative to expensive surveying equipment, the split image transit measures incline or grade to a fraction of an inch. So precise that it can measure an incline at 25 feet and be accurate within the thickness of a dime. Transit has built-in level and reads elevation of target in degrees. Conversion chart on instrument; degrees to inches or meters. Use it to lay pipe, grade lawns, build a patio. 5" H x 2-1/2" W x 3-1/2" L overall size. Weighs 1 lb. Carrying case included.

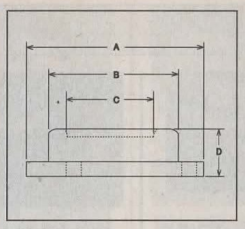
Split Image Transit **E34,182 $43.95**



AUTHENTIC WWII BOMBERS CALCULATORS

These are the circular side-rule-type computers our navigators used to plot their courses to the German targets. Authentic relic and packed in the original carton. Airspeed or Altitude Correction

E36,776 $15.95



CALIBRATED MOUNTED CIRCULAR LEVELS

These are precision circular vials mounted in chrome plated brass cases with three (3) mounting holes for convenience of fastening. Each unit is completely level to the horizontal plane and no additional adjustments are required. The accuracy is guaranteed and maintained through the use of quality materials of glass and machined brass.

DIMENSIONS (INCHES) A	B	C	D	SENSITIVITY PER 0.1 INCH	NO. OF CONCENTRIC RINGS	CROSS HAIR	STOCK NUMBER	PRICE
1.00	.687	.500	.437	45 Mins.	1	No	E40,068	$8.50
1.00	.687	.500	.437	45 Mins.	1	Yes	E39,428	$9.00
1.00	.687	.500	.437	30 Mins.	3	No	E39,429	$9.25
1.250	.844	.625	.437	45 Mins.	1	No	E39,430	$9.65
1.250	.844	.625	.437	45 Mins.	1	Yes	E39,431	$11.50
1.750	1.172	.812	.625	10 Mins.	1	No	E39,432	$22.65
1.750	1.172	.812	.625	10 Mins.	1	Yes	E42,763	$23.95
1.750	1.172	.812	.625	30 Mins.	3	No	E39,433	$34.95
2.250	1.688	1.312	.688	10 Mins.	1	No	E39,434	$42.50
2.250	1.688	1.312	.688	60 Mins.	4	Yes	E39,435	$73.50
2.750	2.219	1.812	.688	10 Mins.	1	No	E39,436	$52.00
2.750	2.219	1.812	.688	24 Mins.	3	Yes	E39,437	$134.00

INCLINOMETER • Level and Angle Finder

Place on surface to be checked and reading is displayed. Provides precision readings to 1/2 of 1°. Level has 4-1/4" edge and built-in magnetic base. Angle and grade chart on back. Weather-resistant, chip-proof plastic.

Inclinometer **E33,417 $18.95**

PRECISION ANGLE LEVEL

Hydraulically balanced, direct reading scale graduated in degrees. Pointer rides on low friction micro-bearings. High-impact ABS construction with stainless steel six inch scale, easy carry belt hook, and magnetic base. Precision is 50.12 degree. Window size 2.68" diameter. Unit size 3.66" x 3.11" x 0.63", weight 3.86 oz. Handy tool for optical instrument set up.

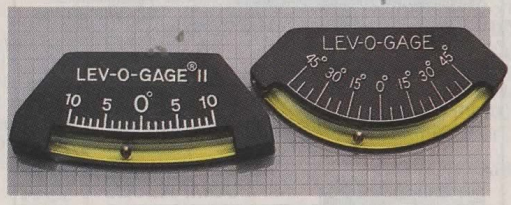
Angle Level **E37,755 $84.95**

STEREO VIEWER

Stereoscope is ideal for engineers, geologists and others using vertical aerial photo maps & 3-D drawings, infrared aerial photos for ecological studies, etc. Full coverage for prints to 5" x 5" . A device for making linear photo measurements. Interpupillary range 55-80mm. Fitted with folding legs adjustable for interocular separation.

2X Stereo Viewer **E42,118 $49.95**

4X Stereo Viewer **E42,651 $59.95**



SELF-ADHESIVE TILT INDICATORS

Precision inclinometers have self-adhesive backs so they stick to any equipment surface. Apply to any straight-edge board or rod for a long span level. High-impact black plastic case, metal indicator ball suspended in liquid and white calibration markings. 3-1/2" L x 3/8" W x 1-3/8" H

Lev-O-Gage I. Calibrated in 5° intervals to a maximum inclination of 45°. **E36,611 $11.95**

Lev-O-Gage II. Calibrated in 1° intervals to a maximum inclination of 10°. **E36,612 $11.95**

ELECTRONIC MOVING SIGN MACHINE

Micro-processor controlled unit. Up to 1,000 characters can be programmed into the sign with a typewriter-style keyboard. Keyboard can be unplugged from sign. Messages can be spelled out left to right or right to left. Built-in rechargeable battery will retain stored messages for up to a month when power is turned off. Message speed can be regulated. LED display, bright red. Black plastic cabinet measures 21-1/8" L x 3-1/4" W x 2-3/8" H. Comes with hardware to mount sign on wall or ceiling or place it on a flat surface. 110V. Weighs six lbs. 6' non grounded cord.

Electronic Moving Sign **E33,395 $449.00**

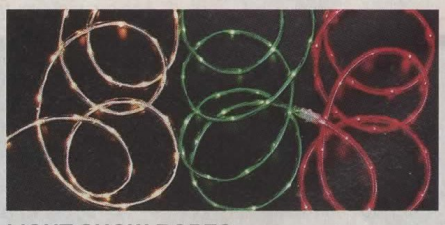
TRANSPARENT DISPLAY DOMES

Sturdy acrylic domes enhance household novelties and commercial displays. Fasten two together to form a globe. Mount on a surface with clips/screws. 1" flange, max. 3/16" thick walls, 7" dome weighs 7 oz., 12"- 14 oz., 16" - 3 lbs.

7" x 3-9/16" Deep Dome **E71,710 $23.95**

12" x 6" Deep Dome **E80,179 $34.95**

16" x 8-1/4" Deep Dome **E85,216 $54.95**



LIGHT SHOW ROPES

Weatherproof Light Ropes create moods, grab attention for sales displays and trade booths and are a one-of-a-kind decoration. UL listed system. Use Light Ropes indoors and out. Male and female connectors at each end so you can mix and match color strands. Clear plastic tubing is 5/8" in diameter. Lights in the rope will move in a stationary pattern or "chase" each other at a variable speed you select. Light Ropes are 12 feet in length.

A controller (sold below)* is required to operate lights.

$22.00 per Light Rope

4-9 Light Ropes **$21.00 Each**

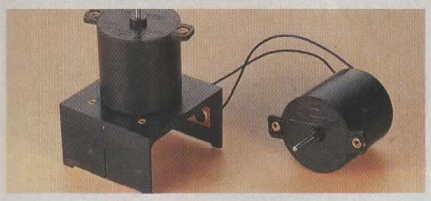
10 or More Ropes **$20.00 Each**

Clear	**E36,656**	**Red**	**E36,659**
Blue	**E36,657**	**Amber**	**E36,660**
Green	**E36,658**	**Multi**	**E35,279**

***Light Controller.** Forward and speed control. 110V/60Hz input. 300W x 3 channel output. Speed selector switch will handle up to 8 Light Ropes. 6-3/4" x 2-3/4" x 1-1/2".

E35,280 $32.95

Commercial Motors
Standard manufacturer's item, continuing supply available.



HIGH TORQUE MOTORS
Practical for industrial and laboratory application. Self-starting motors feature slow speed and high torque, DC reversible gear trains. Motor housing $1^{13}/_{16}$"L × $1^{13}/_{16}$" O.D. Steel shaft ⅛" dia. × $^{11}/_{16}$"L. Weight approx. 2¾ oz. No-load drain approx. 8mA at 12V. Continuous run, low temp. 3V motors have twist on battery case except #35,724. **$19.95 Each**

Speed (rpm)	Stall Torque(in.-oz.)	Number 12 Volt	3 Volt
1	65	E41,860	E41,327
2	31	E41,331	E41,861
7	12	E41,863	E41,862
16	5	E41,865	E41,864
30	2.4	E41,333	E41,329
115	0.8	E41,867	E41,866
4	18		E35,724

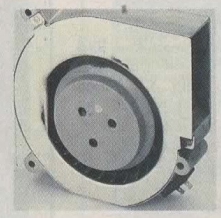
SPECIALTY MOTORS
Hubs on shafts to accommodate wheels with ¼" center holes. Features threaded shafts, wing nut, 6 ft. cord, plug, ccw rotation. 115V and 60 Hz.

RPM	Number	Price
1	E60,734	$34.95
12	E60,714	$34.95
30	E60,763	$34.95
60	E60,733	$34.95

CHANGE DC TO AC
Power inverters change 12V DC to 117V AC output. Transistorized. 60Hz. Stand-by power supply. PV100 has cigarette lighter plug-in cord. Other units have connection terminals for attaching heavy gauge wire. Wire is not included. PV500 and PV1000 have ±½Hz. frequency control.

Model	PV100	PV200	PV400	PV500	PV1000
Input V DC	12	12	12	12	12
Output V AC	117	117	117	117	117
Max W Con Output	100	200	400	500	1000
Max W Inter Input	110	220	440	550	1100
Input Amps No Load	2.5	3.5	3.5	3.5	3.5
Polarity Protection	NO	NO	NO	YES	YES
Overload Indicator		Fuse	Fuse	Circuit Breaker	Circuit Breaker
Wire Gauge	18	12	8	6 or 2×10	2 or 2×6
Weight, Pounds	5	6	10	19	32
Item	E31,810	E35,776	E35,777	E35,778	E35,779
Price	$99.95	$135.00	$200.00	$420.00	$620.00

PIEZO ELECTRIC FAN
Powered with 110V/60Hz, this solid state fan requires 1/10th the energy of rotary types and fits into small areas for spot cooling. Highly reliable; instant start; no wearing parts. 7CFM; 1.2 ounces for that hot IC in your computer or stereo. 2.8" long; wide end 2.15"; narrow end 1"; .68" thick. Mylar blades.
Piezo Fan E36,563 $17.50
3 or More, $16.50 Each



BISCUIT BLOWER FAN
Surplus 5" diameter blower. Wire leads, all metal housing and three mounting holes. 115VAC, 60Hz, .26 amps, 22 watts, 1½" thick. Originally used on copying equipment. Blows about 20 cubic feet per minute out the side.
Blower Fan E34,591 ~~$10.95~~ **On Sale $8.95**
Speed Control E34,760 $4.95

NEW INDUSTRIAL SURPLUS FANS
These super quiet fans may be installed in walls, equipment...anywhere you need cooling and exhaust. Choose from three square frame models.

3" Fan. 110V motor, approx. output 45CFM, 60HZ, 5 to 6W. Metal frame with four mounting holes; plastic blades. **E33,588 $19.50**
3½" Fan. West German fan is rated 18VDC2W—30VDC5W; will run on 12V. Metal frame and blades; three mounting holes. Permanent magnet motor with two contact pins for wiring. **E36,838 $13.50**
5" Fan. 110V motor, approx. output 45CFM, 60HZ, 12 to 14W. Metal frame; plastic blades; four mounting holes. **E33,196 $21.50**
Speed Control E34,760 $4.95

ULTRA VIBE INDUSTRIAL TUMBLER
This vibratory tumbler has a removable heavy polyethylene bowl and lid. Large 1½ gallon capacity has a cyclonic effect on the masses being tumbled. The ball bearing motor operates on 115 volts and is thermally protected. Vibrates at 3000VPM. Unit measures 11½" diameter × 12½" high; weighs 11 lbs. 18 lb. capacity.
Rock Tumbler E36,998 $220.00
Grit Pack E36,999 $16.50

AIRCRAFT GRADE ALUMINUM HIGH-INTENSITY PENLIGHT
- **Waterproof To 200 Ft.**
- **Compact, Only 5½" Long**

High intensity aerospace argon lamp is 70 times more powerful than an ordinary penlight and provides a focusable brilliant white beam. Durable flashlight body is machined from aircraft-grade aluminum and features a black-anodized sure-grip knurled finish. All threaded joints are O-ring sealed so unit is waterproof to 200 ft. The head of the light is its on/off switch and focus adjust. A simple turn and it is on . . . continue for spot focus. Powered by two "AA" batteries.
A) Flashlight Only E35,767 $16.95
B) Flashlight And Accessory Kit: Includes red night-vision filter, yellow fog filter, clear protective filter, filter holder, 8" wrist lanyard with split ring, pocket clip and 2 alkaline batteries, plus the flashlight. E36,827 $21.95

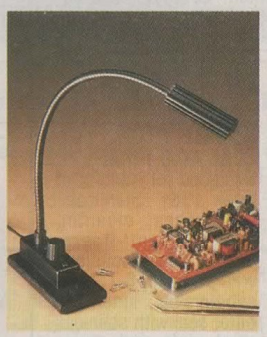
POCKET BLACKLIGHT
Mini blacklight fits in shirt pocket. 2¼" × ¾" × 7". Ideal for rock hunters, bug collectors, etc. 3½ oz. Requires four "AA" batteries (not included). 4 watts.
Blacklight Pocket Lantern E35,485 $36.95
Extra Bulb E35,486 $17.50

FLUORESCENT BLACKLITE
For brilliant blacklite effects, this 18 inch long, 15 watt blacklite tube illuminates large areas of posters, paints, walls, etc. Completely assembled unit comes with screws and instructions for mounting. Includes reflector, 6 ft. cord, on/off switch. 118V, 0.35amp, 60Hz. UL Listed.
Blacklite E34,501 $29.95

FLEXIBLE LAMP WITH GOOSENECK SHEATHING
Probe-Lite delivers 1,000 footcandle intensity. Bulb is mounted on an 18" flexible arm and will fit into a 9/16" diameter opening. Grounded transformer at end of 10 foot cord. Plugs into 110 volt outlet. Power consumption 4 watts. Hand-held or curl end to form a stand.
Probe Lite E35,809 $85.00

HEADLIGHTS FOR PEOPLE
- **Provides Hands-Free Light Source**

Worn just like glasses. The two headlights become two bright eyes. Also for night reading and hobbies. Made of black polypropylene. Works without switches, cords or battery packs. Powered by four "AAA" batteries (included). **E33,250 $16.95**
HeadLights For People **3 or More, $14.95 Each**



LITTLITE™: A PRECISION HIGH INTENSITY LAMP
5W tungsten filament halogen bulb provides 25 footcandles at 12", four times that of standard bulbs. Aluminum extrusion hood with integral heat sink fins direct light where you want it. Gooseneck sheathing. Weighted base measures 3⅞" × 1⅞". Has slot for color filter gel.
Littlite™ E31,995 $69.95
Replacement Bulb E35,608 $9.95

DEMAGNETIZER-MAGNETIZER
Demagnetizes or magnetizes steel tools, taps, drills, screwdrivers, surgical tools, watch parts and standard tape cassettes. Coil opening 1½"H × 3"W. Rigid molded Cycolsac-T housing with momentary on/off switch, 8 ft. cord, 120V/60Hz, 300 watts.
E36,714 $57.95

SMALL SUBMERSIBLE UTILITY PUMPS

Little Giant Submersible Pumps operate when completely submerged. Because they are hermetically sealed, motor windings can never become wet. All die cast aluminum pumps are covered with a corrosion resistant coating. Each is filled with a special oil that provides lifetime lubrication and rapid dissipation of heat through housing. Designed for liquid transfer or circulation of water, non-flammable light oils and mild liquids. All are U.L. listed and each has a 6′ cord with 3 prongs.

Small Pump: 3⅞″H × 3⅝″L × 3″W, can be set on any of five sides, impedance protected, 1/160hp, 0.5A, 30W, ¼″MNPT discharge, 2.1 pounds weight.
E36,414 $44.95

Medium Pump: 4½″H × 5½″L × 3½″W, thermally protected, 1/40hp, 1.7A, 100W, ¼″MNPT vertical discharge, 4.1 pounds weight. **E36,415 $64.95**

	PSI	Gallons Per Hour 1′	3′	4′	6′	Shut-Off
Small	2.0	120	70	40	—	4.6
Medium	5.1	300	255	230	185	11.8

LITTLE GIANT WATER WIZARD

Completely portable and easy to use. Just attach a garden hose or 1″ pipe, set the pump into water at least ¾″ deep and plug into a grounded 120 volt AC outlet. The Water Wizard will remove water to within ⅛″ of floor. 8 ft. cord with 3-prong grounded plug. Max. pumping height 26.3 feet. Thermally protected. 7-¾″H × 4⅝″W × 6⅛″L. Garden hose adapter included. U.L. listed, weighs only 7 pounds, 1/6hp, 5.0A, 380W, 11.4psi.

Gallons Per	1′	5′	10′	15′	20′
Minute	20.4	19	16	13	8
Hour	1225	1150	960	780	480

Water Wizard Pump **E36,416 $89.95**

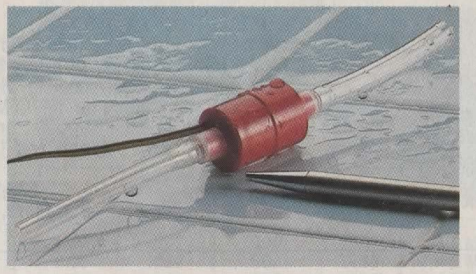
Convert Water Wizard to Automatic Operation. 115V, 10A with 10 ft. cord, U.L. listed. On Level 7⅜″ + ⅜″, Off Level ¾″ + ⅜″. Remote Switch. **E36,417 $32.95**

DOUBLE VITON SEAL ACID PUMP

Designed for transfer of weak acids, chemicals, fruit-juices, cleaning solvents, anti-freeze, potable fluids, solutions with pH factor 6-7. Non-submersible, inner and outer seal with stainless steel plate and motor shaft. Nylon front with ⅜″ FNPT intake. Adapter included for ½″ O.D. intake, ¼″MNPT discharge, 6′ cord with 3 prong plug, thermally protected, weighs 5.4 lbs., 1/40hp, 1.7A, 100W, 4½″H × 5½″L × 3½″W.

PSI	Gallons Per Hour 1′	3′	4′	5′	7′
5.1	300	255	230	205	160

Acid Pump **E36,418 $87.00**



RECIPROCATING SUBMERSIBLE PUMP

It operates underwater on 12VAC to 20VAC. Lifts 1 pint per minute at 12 in. head (on 20VAC) and pumps a steady fountain-like stream of liquid over 30 inches high on 20V (with recommended 3⁄64″ nozzle). The plastic, waterproof case is 2½″ × 1″ diameter. Weighs only 1¼″ oz. With care, requires no servicing.
Submersible Pump **E60,307 $26.95**

OSCILLATING PISTON PUMP

Designed to meet the unique requirements of laboratory equipment, carpet cleaners, smoke generating machines, etc. Operation: 110V 50/60Hz. Positive displacement principle. A diode converts the AC power to DC impulses 60 times per second. Displacement of fluid occurs as the piston is energized forward, forcing fluid out of the pump under pressure and drawing fluid into the inlet. While piston is de-energized, a spring forces piston back to its original position. A series of ball check valves prevent fluid from re-entering the pump.

SPECIFICATIONS:
Max. Flow Rate: 38gph at 165 psi
Max. Fluid Temp.: 120° F
Duty Cycle: Intermittent
Approx. Size: 5″L × 2″W × 3″H
Weight: 1.5 pounds
Two rubber hanging mounts included

MATERIALS IN CONTACT WITH SOLUTION:
Piston: 430SS
Springs: 302SS
O-Rings: EPDM
Sleeve: Acetyl Copolymer
Ball Valves: Glass

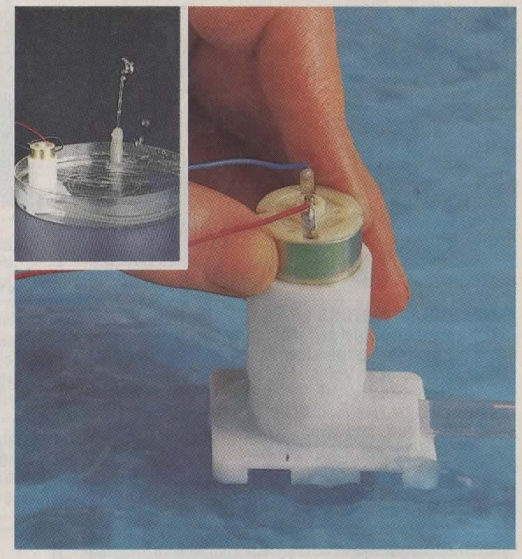
Piston Pump **E38,660 $26.95**

LIQUID HANDLING SYSTEM WITH INSTANT SELF-PRIMING

This rugged instrument pumps 350 gallons per hour and lifts most liquids 20 feet high or pushes up to 50 feet! Pumps out basements, boats, septic tanks or fills stock tank reservoirs, etc. Plugs into any 115VAC outlet and has a grounded power cord and overload protection. Handles water, milk, brine, etc. (not for use with gasoline, solvents or acids). With motor/pump, two hoses, power cord and strainer.
Self-Priming Pump **E71,440 $110.00**

NEW EPOXY-ENCAPSULATED SMALL SUBMERSIBLE PUMP

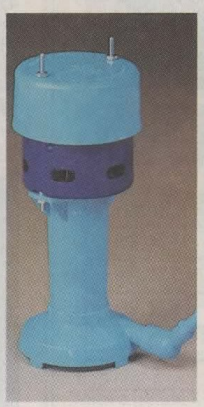
Compact, submersible pump with epoxy-encapsulated motor; outer case is constructed of durable die cast aluminum and polyester. Volute, impeller and screen are polypropylene. Ideal for water gardening, small statuary, small fountains & waterfalls. Also recommended for fresh water circulation/aeration in aquariums. 115V AC, impedance protected. 0.6A, 30W, 3⅝″H × 3¼″L × 2¾″W, 1/125hp, 3.0psi, ¼″MNPT discharge, weighs 3 lbs., 3-prong plug; 100 gallons per hr. at 5′.
Pump With 6′ Cord **E37,748 $49.00**
Pump With 18′ Cord **E37,749 $54.00**



EDMUND'S PERFECT MINIATURE PUMP

- **Edmund Designed and Engineered**
- **Popular Science Project Component**

For photography darkrooms, science fairs, table fountains, moving water displays. Pumps up to 1 pint per minute with 12″ high flow. Can use this handy pump in either direction. It is self-priming; uses 1½ to 3 VDC. Operates on two flashlight batteries and runs up to 48 hours before a battery change is needed. 4″ tube included.
Miniature Pump **E50,345 $7.50**
3 to 19 Pumps, $6.50 Each; 20 or More, $5.50 Each



HIGH CAPACITY, LOW COST VERTICAL PUMP

This compact, general use vertical pump comes complete with an air-cooled, heavy-duty motor. It's perfect for use in evaporative coolers, laboratory liquid transfer and moving water displays. Pumps three hundred gallons per hour one foot high or two hundred and thirty-five gallons five feet into the air. It delivers 3.7psi maximum. Weighs only 2.14 pounds. Comes complete with a thirty inch cord, two leads and is equipped with a hose adapter. 115VAC 60Hz.
Vertical Pump **E71,599 $31.95**

Compressors

A) VACUUM PRESSURE PUMP

Continuous operation to 20Hg. or 17psi with free-air capacity of 900 cu. in./min. Motor: 1/45hp at 1550rpm. 115VAC, 60Hz. 7¼″ × 4″ × 5½″.
Vacuum Pressure Pump **E31,057 $179.95**

B) SURPLUS AIR COMPRESSOR

New condition rotary van compressor, 1/4hp, 115V motor. 60 cycle single phase. 1725rpm. 60Hz. Thermally protected. Rated at: Opsi-2.5CFM; 5psi-2.1CFM; 10psi-1.7CFM; 15psi-1.4CFM. Max. pressure 10psi continuous, 15CFM intermittent. 10½″L × 6½″H X 6″W. 30 lbs.
Air Compressor **E35,939 $110.00**

DREMEL MOTO-TOOL® KITS & ACCESSORIES

Recognized as the finest quality precision miniature tools for industry and hobbyist, Dremel Moto-Tool® kits come with accessory assortments including: Cut-off wheels, sanders, grinding stones, cutters, polishers, drills, mandrels, chucks and collets.

A. VARIABLE SPEED MOTO-TOOL® KIT
• 40 Piece Accessory Kit

Select the right speed for every job. Variable speed control from 5,000 to 30,000 RPM. Features ball bearing motor construction for long life, tapered design for finger-tip control, double insulated motor, no grounding required, 6 foot cord, keyless chuck for bits up to 1/8" plus deluxe storage case and 40 piece accessory/bit assortment.

Moto-Tool® Kit **E35,680 Regularly $112.95**
Sale $99.00

B. CORDLESS TWO-SPEED MOTO-TOOL® KIT
• 30 Piece Accessory Kit

Tackle projects in remote or out of reach places with this cordless moto-tool® with either low speed (15,000 RPM) or high speed (20,000 RPM). Features high torque 6.0 Volt motor, five Ni-Cad batteries for lasting power, recharges in 3 hours, LED charging indicator, keyless chuck with 1/8" collet, deluxe plug-in carrying case with recharger and 30 piece accessory/bit assortment.

2-Speed Moto-Tool® ***Kit Reg. $101.00*** **E39,373 $89.00**

Cordless 2-Speed Moto-Tool® and Recharger Only
Regularly $ 79.00 **E39,374 $69.00**

ACCESSORIES For Above Units Only:

Drill Press. Convert Moto-Tool® into a precision drill press, rack and pinion feed handle, calibrated depth shaft, 6 x 6" slotted base. **E35,684 $52.95**

Router Attachment. Converts Moto-Tool® into a precision router for edging, shaping, grooving, recessing and freehand design. Comes with 1/8" straight router bit. **E35,787 $29.95**

Moto-Tool® Holder And Base. Holds Moto-Tool® in any position, leaving hands free to control workpiece. Includes holder, post, adjustable base. **E35,679 $37.95**

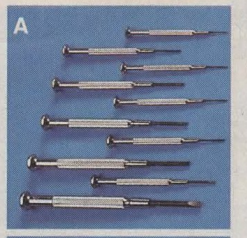
D-Vise And Moto-Tool® Holder. D-Vise gives you an extra hand. Has removable V-groove jaws, 2-1/2" jaw opening, die cast metal housing, 3 point non-rocking base. With post, adjustable base and Moto-Tool® Holder. **E35,685 $54.95**

Table Top Speed Control. Lets you dial speeds up to full RPM. 5 AMP capacity. **E35,682 $47.95**

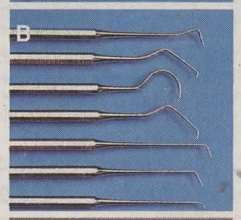
Foot Operated Speed Control. Settings up to full RPM. 6 AMP capacity. **E35,683 $49.95**

Flexible-Shaft Attachment. Versatile 36" long cable attaches to Moto-Tool® with 1/2" dia. slim-grip handpiece at other end to accept bits. ***Regularly $34.00*** **E39,375 $29.00**

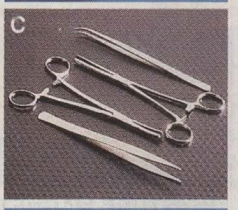
Cordless Minimite™ Rotary Tool
A smaller, compact version of the famous Moto-Tool®, Minimite™ features a two-speed motor (5,000 and 10,000 RPM), removable Ni-Cad battery pack with 3 hour recharge cycle, plug-in charger with LED indicator, fast change collet for up to 1/8" shank, 4.8V DC motor and 5-piece accessory kit (cutter, drill, wire brush, drum sander, sander band).
Regularly $48.00 **E39,376 $39.00**



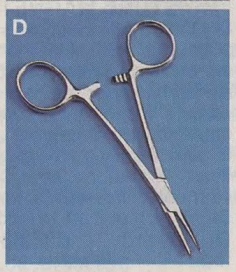
A) MICRO SCREWDRIVERS
This 10 piece set is perfect for jewelers, camera buffs and hobbyists. Tempered steel blades. Swivel top. Non slip knurled shaft. 0.024" to 0.15" L blade widths (0.6 to 3.8mm). Packaged in handy storage pouch.
Micro Screwdrivers
E41,671 $18.50



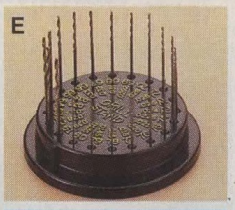
B) 7 USEFUL TOOLS THE BEST AVAILABLE
Pik Pack tool set is for all fine detail work. Surgical quality, German-made stainless steel tools are designed to last a lifetime. Range in size from 5-1/4" to 7" long.
E33,059 $44.95



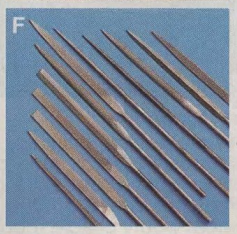
C) THIRD HAND HOBBY TOOL SET
Chrome plated steel tools provide an extra hand in small assembly or repair projects. Includes two 7" tweezers, both straight and curved jaws, two 7-1/4" hemostat locking pliers.
E34,588 $17.75



D) SURE-LOCK HEMOSTAT PLIERS
Pliers allow for hands-free clamping of small items, including wires. Scissor design. Adjustable tension. Stainless steel.
E40,571 $7.95



E) DRILL BITS FOR MICRO HOLES
20-piece set consists of quality long-lasting carbon steel bits, from #61 through 80 indexed. Bits measure from 0.013" to 0.038" in diameter.
E41,941 $27.95

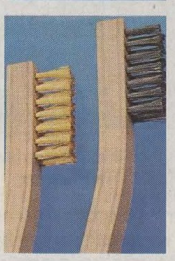


F) MINIATURE NEEDLE FILES
12 -5-1/2" long files are built to industrial specifications. Flat, round, diamond, oval and wedge shapes. Coarse to fine. Package of 12.
E30,113 $17.95

PRECISION POINTED TIP SWISS STAINLESS TWEEZER SET
Made by Dumont in Switzerland, these hi-tech tweezers are 100% anti-magnetic stainless steel. They provide sensitive touch and very fine action for delicate jobs; balance and finish are both excellent. They are particularly suited for electronic, optical and miniature mechanical assembly, plus camera repair. Straight 5-1/2", Bent 4-1/2", Curved 4-1/2" and Negative Locking 4-1/2".
Tweezer Set **E37,609 $54.95**

TWEEZERS FOR FINE WORK
Medical tweezers are a superior precision pair of surgical quality tweezers, hand-crafted of 100% stainless steel. Ideal for splinters, ingrown hairs; will tweeze the finest hair. 4-3/8"x5/16". Opens to 3/8".
Tweezers **E31,345 $9.75**

FIVE PIECE TWEEZER SET
Five piece tweezer set is drop forged and nickel plated to resist rust. Set includes a 4-3/4" stamp tweezer; a 4-1/2" sharp pointed tweezer with serrations: a 6" retrieving tweezer; a 6" curved tweezer for positioning small parts; and a 6-1/2" self-closing tweezer for soldering applications.
E34,831 $17.50



WIRE SCRATCH BRUSHES
American-made brushes have laminated plywood handles. Water resistant. Angled heads for working ease. Steel, brass, and Tynex nylon materials.
Sold in Pkgs. of 3.
Brass **E34,346 $5.75**
Stainless Steel **E36,615 $5.75**
Nylon **E36,616 $5.75**

INSPECTION MIRRORS
360° all-angle ballpoint (swivel) mirrors; brushed finish stainless steel; glass mirrors. Vinyl grip coated handles.

Stock No.	Retail	Mirror Size	Arm Length Extended/Not Extended
E60,010	$9.75	Rectangular 2-1/8" x 3-1/2"	15-1/4" / 11-1/4" Telescoping
E36,517	$8.00	Circular 3-1/4" dia.	15" / 11" Telescoping
E60,012	$7.75	Oval 1"x2"	8-1/2" not ext., with pen clip
E60,013	$7.75	Circular 1-1/4" dia.	8" not telescoping
E60,011	$6.75	Circular 3/4" dia.	7" not telescoping
E60,014	$9.75	Circular 2-1/4" dia.	13" / 7"
E60,004	$6.25	Circular 15/16" dia.	6-1/2" fixed
E36,519	$13.00	Rectangular 2-1/8" x 3-1/2"	27-1/2" /17-1/4"
E60,005	$6.25	Circular 7/8" dia.	6-1/2" Stat. Magnifying
E36,522	$6.00	Circular 7/8" dia.	18" / 4-1/2" with Pen Clip
E36,523	$6.75	Oval 1"x2"	191/2" / 41/2" with Pen Clip
E34,788 Pen Light w/Clip-on Mirror	$15.75	Rectangular 1"x1" 2-piece Illuminated from flashlight	12" arm. Rod detaches (2 "AA" not included)

LUMINOUS ACRYLIC PAINT GLOWS IN THE DARK
• Water Soluble

Permanent acrylic paint absorbs and stores daylight or artificial light, then glows in the dark. Non-toxic, water reducible and adheres to wide variety of surfaces. Dries to permanent water-resistant finish. Non-radioactive. Ideal for safety applications, displays, astronomy charts, etc. 2 oz. bottle.

Paint E31,806 $9.95

CLEAR CASTING PLASTIC

This top quality resin hardens to water clear. Pours like water and sets like glass at room temperature. An excellent resin. One quart, with one bottle of hardener.

Clear Coating Plastic
E33,620 $22.95

MULTI-USE LATEX RUBBER MOLD COMPOUND

Duplicates almost any object in detail. Forms flexible, durable molds. Use with plaster, expandable foams or similar materials. One quart container. Instructions included.

Compound E42,446 $18.95

GLASS ETCHING KIT

Custom Stencil Kit includes everything you'll need to turn glass into artwork. Each kit contains stencil assortment, glass etching cream, hobby knife, gloves, masking vinyl, applicator brush, instructions, more.

Etch Kit E34,345 $22.95

MOLD MAKING MATERIAL LETS YOU MAKE BODY OR FACE MASKS OR COPY ALMOST ANY EXISTING CRAFT OBJECT

Flexwax 120, melts to a clear, honey-like liquid at 120°F. Brush or dip on. Cools in minutes. Make molds from carved objects, clay originals or most other craft items. Non-toxic. No volatiles. Inert material is reusable. Includes directions. Five pound block.

Flexwax E34,840 $24.95

DESIGNER'S MODELING PLASTIC STAYS SOFT UNTIL IT'S BAKED

Prepare product designs easily without premature hardening. Non-toxic, compound remains soft, (when stored away from heat) until baked in conventional home oven (300°-320°) for 30 minutes. Can be tooled, rolled, cut, extruded or formed over molds. Will not warp or shrink during cure. After baking, it can be drilled, sanded, carved or painted. Excellent handling qualities. Not recommended for children.

A) White Plastic.
2 Lb. Box E60,794 $8.75
4 or More Boxes $7.98 Each

B) Multi-Color Sets: Each set contains 2 ozs. each of 10 colors.
$10.95 Each

1) Basic Color Set. White, purple, green, orange, black, brown, yellow, red, blue, flesh. **E37,517**

2) Brilliant Color Set. Ivory, pink, turquoise, purple, green, brown, blue, yellow, red, translucent. **E37,518**

3) Metallic Color Set. Purple, blue, green, copper, bronze, pewter, pearl, pink pearl, light blue pearl, light yellow pearl. **E37,519**

C) Paint and Sealer Set: Six-1 oz. jars of acrylic paint in basic colors and 1 oz. jar of clear sealer. **E37,702 $8.95**

D) Glaze Compound: An airdrying water thinnable glaze for coating all baked Sculpey products. Six-1 oz. jars.
E37,703 $8.95

SHOCK ABSORBING SORBOTHANE

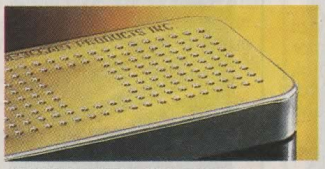
Absorbs up to 94.7% of impact energy, then reforms to its original shape. 12" x12" x1/8" sheet. Sorbothane is a "solid" that behaves like a "liquid" by absorbing shock in all directions. For scientists, designers, experimenters.

Sorbothane Material E37,000 $49.95

MOISTURE REMOVING DRI RITE

Chemical preserves garden blooms, leaves and grasses for decorative displays. Also a must for those who store optical equipment.

4 Lbs. Package E34,864 $23.95
3 or More $15.95 Each



"MOISTURE MAGNET"

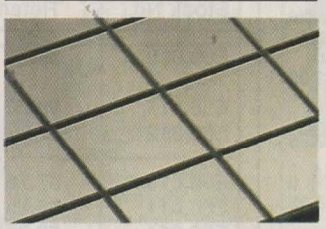
Dry-Guard aluminum canister (4" L x 2" W x 1/2" Thk.) of moisture absorbing chemical beads. Placed in any closed container (up to 3 cu. ft.), it attracts water vapor, condenses it and holds it in. Beads turn from blue to pink, signaling time for regeneration (just heat in oven). Chemically inert, non-corrosive, non-toxic, will not impart odor or taste to foods.

Dry-Guard E36,681 $7.50
3 or More, $6.75 Each

PLASTIC DIP

Protect, seal, insulate, prevent corrosion, shock, stop rope-end fraying and add extra gripping power with industrial grade heavy duty pliable rubber coating. Formulated to give a smooth, thick, drip-free coating on almost any material (metal, glass, wood, foam, plastic & rubber). Will not chip, crack or peel. Weather, acid & salt resistant. Air dries. 14.5 oz.

$7.95 Each
4 or More, $7.50 Each
Red E36,917 Blue E36,920



FLEXIBLE-BACKED GLASS MIRRORS

Create startling new designs on flat, concave or convex surfaces with easy-to-install flexible mirror sheets. Used by architects and interior designers for unique accents in homes and offices. Just peel back sheets for single use or cut. 144 1/2 x 1/2" mirrors on a 6" x 6" sheet.

Flexible Mirror Sheet
E60,239 $10.95

SUPER STRONG KEVLAR FIBER BY DUPONT

Lightweight, aramid fiber is five times stronger than steel on an equal weight basis. High modulus material is the same fiber that's used in bullet-proof vests. Has high flame and cut resistance and useful properties over a wide range of temperatures. Kevlar is used in broad-woven fabrics, and for ropes, cables, webbing and tapes. 600 yd. spool. Yellow color.

Fiber E34,863 $14.50

VELCRO® & VELCROIX FASTENERS

Attach just about anything anywhere with this space age material. Sold by the yard, includes hook & loop sides.

Adhesive-backed 100% Nylon Velcro®. 1" Wide.

1 Yard	E34,215	$6.75
5 Yards	E35,457	$26.95
25 Yards	E34,889	$124.00

Non-Adhesive Velcroix Scotchmate

1 Yard-5/8" Wide	E35,431	$3.00
25 Yards-5/8" Wide	E35,458	$50.00
1 Yard-3/4" Wide	E35,432	$3.25
25 Yards-3/4" Wide	E35,459	$55.00
1 Yard-1" Wide	E35,433	$3.50
25 Yards-1" Wide	E35,460	$59.00
1 Yard-1-1/2" Wide	E35,434	$4.75
25 Yards-1-1/2" Wide	E35,461	$90.00
1 Yard-2" Wide	E35,435	$5.25
25 Yards-2" Wide	E35,462	$ 99.00

Velcro® Special Adhesive: bonds Velcro® strips to porous and non-porous surfaces. 24 hour full cure.
Package of four 1 oz. tubes. E36,574 $7.95

DIP COAT OR BRUSH-ON ELECTRO-PLATING KITS

Restore scratched or worn jewelry, guns, cameras, trophies, antiques, printed circuits—almost anything made of metal—in minutes with our safe, non-cyanide process electroplating kits. Create your own jewelry. Each kit includes brush and dip-coater heads with anodes, battery case electrolyte (uses "AA" cells, not included), metal polish or conditioner, (to clean surface before plating), wire clip and instructions. Six kits to choose from.

Electroplating

Silver	E61,003	$39.95
24K Gold	E61,004	$79.95
Chromelike	E61,005	$34.95
Rhodium	E61,006	$115.00
Copper	E61,007	$29.95
Gloss Black	E61,008	$39.95

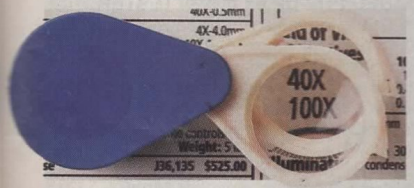
Refill Kits

Silver	E42,018	$23.95
24K Gold	E42,019	$49.95
Chromelike	E42,020	$19.95
Rhodium	E42,021	$72.95
Copper	E42,022	$23.95
Gloss Black	E42,023	$29.95

MAKE BUTTONS AND BADGES FOR ALL OCCASIONS

Make an attractive, long lasting button in about 30 seconds. Buttons can be made from almost any thickness paper. Machine accepts most photographs. Cut the button insert to two inches in diameter, place between the dies and press. That's all there is to it! It's a great fundraising idea for any organization. Durable cast-metal button press (12" x 6") works with just the press of the handle. Comes with four dies - top, ring, crimping and base. Kit includes everything that's needed to make 25 buttons, including metallic base and clear mylar covers. Replacement parts are available.

Bench Press Kit. Press and pieces to make 25 badges. (As Shown)	E80,338	$115.00
Hand Held Press. Small 8" x 6" press. Includes four dies and pieces to make 25 buttons. (Not Listed Below)	E72,542	$89.95
Accessory Circle Cutter: with retractable razor-sharp blade.	E31,127	$32.95
Replaceable Circle Cutter Blades (pkg. of 2)	E31,128	$10.95
Badge Parts. Includes metallic base with pin backs & clear mylar covers.		
100 Parts (20 cents per badge)	E71,976	$19.95
250 Parts (17 cents per badge)	E72,153	$41.50
500 Parts (14 cents per badge)	E72,154	$78.50
1,000 Parts (13 cents per badge)	E72,155	$139.50



4X-6X-10X FOLDING POCKET MAGNIFIER

Acrylic lens version of our popular multi-lens folding magnifier. By using each lens separately, or in combination, 3 powers are possible. Lenses swing into protective plastic case which also serves as a handle.

Magnification:	4X	6X	10X (4X & 6X)
Working Distance:	2-1/4"	1-1/8"	1/2"
Field of View:	2"	1"	3/4"

E38,657 $4.75
10 - 24, $4.50 Each
25 - 99, $4.25 Each
100 or More, $3.75 Each

3X/5X BIFOCAL MAGNIFIER

Two magnifiers in one compact handle. 4-1/2" long overall, 2"diameter head, 1/4" thick. Shatterproof optical grade acrylic. Lenses mounted side by side.

3X/5X Magnifier		E36,241
Magnification:	3X	5X
Lens Diameter:	1-3/4"	5/8"
Working Distance:	2"	1-1/2"

12-499 Pcs. $1.52 Ea. 500-999 Pcs. $1.27 Each
1,000-2,499 Pcs. $.97 Each
2,500-5,000 Pcs. $.91 Each

3X/5X BIFOCAL CASE MAGNIFIER

Made of shatterproof optical-quality acrylic, 3X/5X bifocal magnifier swings out of a padded soft vinyl case (2-1/2" L x 2" W) which doubles as a handle and protects the lens.

Magnification:	3X	5X
Lens Diameter:	1-7/8"	1/2"
Working Distance:	3"	1-1/2"
Field of View:	3"	1/4"
3X/5X Magnifier	E36,242	$3.75

12 or more, $3.00

BIFOCAL ACRYLIC READING GLASSES

Our bifocal magnifiers feature two magnifications in one reading glass. Each has a higher power mini-lens set into the main lens so you can quickly switch to detail inspection. These shatterproof acrylic optics provide safety.

Magnification	2X/4X	2X/4X	2.5X/5X
Lens Diameter:	3"/3/4"	2-1/2"/5/8"	1-7/8"/1/2"
Working Dist.:	5-1/2"/2"	4-1/2"/2"	3-1/2"/2"
Stock Number:	E36,229	E36,230	E36,231
Price:	$3.50	$3.00	$2.50

PUT YOUR LOGO ON THE MOST UNIQUE PREMIUM AVAILABLE - OUR FAMOUS JUMPING DISC... AN EYE CATCHING PREMIUM!

Put your name at your client's fingertips. Our jumping discs are the ideal snappy promotion that will keep your sales jumping. Discs jump to three feet high. Everyone who sees one, wants one. Full of fun and surprises. Simply click a jumping disc between your fingers, rub for a second, lay it down on any smooth surface...and POP! It leaps into the air. Friends, clients and customers won't be able to resist tinkering with this fun scientific item. As each disc is used over and over, your sales message is seen again and again. **HOW THEY WORK :** These nickel and stainless steel discs work on the principle of thermodynamics. Heat makes metal expand; cold makes it contract. Rubbing the disc makes it expand. Placing it on a flat cool surface allows it to contract. Each disc is one inch in diameter and 0.10 inch thick.

CUSTOMIZING INSTRUCTIONS

Prices quoted are FOB Barrington, N.J. A $29 first-time order engraving charge must be added. Send camera-ready art. Layout: 3-4" diameter. Final design: 7/8" diameter. We will design your jumping disc for you with a $25 service charge. Specify colors. Allow three to four weeks for delivery of first order. Reorders can be shipped faster. On very large orders, partial shipment will be made in approximately three weeks. Jumping discs are sold only in multiples of 1,000.

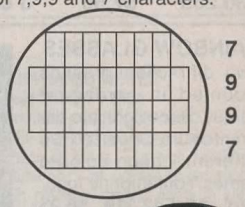
QUANTITY PRICING & ITEM NUMBERS:

	One-Color Discs		Two-Color Discs	
Quantity	Stock Number	Price/M	Stock Number	Price/M
1M to 4M	E19,161	$135.00	E19,162	$145.00
5M to 24M	E19,164	$125.00	E19,165	$135.00
25M to 99M	E19,167	$120.00	E19,168	$130.00
100M to 499M	E19,170	$115.00	E19,171	$125.00
500M to 999M	E19,173	$110.00	E19,174	$120.00
1,000M & Over	E19,176	$105.00	E19,177	$115.00

CUSTOMIZE YOUR OWN JUMPING DISCS

Here's a premium that springs out to attract your customers. Unique personalized greeting for any occasion. Typewriter-style black lettering. Room for message of 7,9,9 and 7 characters.

100 or 200 Discs	E29,100	$24.50 per 100
300 or 400 Discs	E29,101	$22.50 per 100
500 and up Discs	E29,102	$19.50 per 100



EDMUND'S FAMOUS BI-METAL JUMPING DISCS

Available with our ES logo or try "Jumping Quarters"

ES Logo: 12 Jumping Discs	E41,150	$4.25
ES Logo: 100 Jumping Discs	E41,180	$17.95
Jumping Quarters: 12 Discs	E42,099	$4.25
Jumping Quarters: 100 Discs	E42,278	$21.95

ILLUMINATED ACRYLIC MAGNIFIERS

- Hi-Tech Lightweight Plastic Body
- Bifocal And Single Power Designs
- Shatterproof Optical Acrylic Lens

Our economical hi-tech design illuminated magnifiers give you all the features of much more expensive models. A shatterproof optical grade acrylic lens is mounted in a comfortable-to-hold handle and a built-in mini-bulb illuminates the field of view. The bifocal design provides the convenience of two magnifications in one frame. Batteries are not included.

SPECIFICATIONS:

Magnification:	3X	2.5X	2X	2.5/5X	2/4X	2/4X
Lens Diameter:	1-1/4"	1-1/2"	1-3/4"	2"/1/2"	2-1/2"/5/8"	3"/3/4"
Working Distance:	1-3/4"	2-1/4"	3-1/4"	1-1/2"	4-1/2"/2"	6"/2"
Field of View:	1"	2"	3"	3"/1/2"	4"/5/8"	5"/3/4"
Power Requirements:	2 "AAA"	2 "AA"	2 "AA"	2 "AAA"	2 "AA"	2 "AA"
Stock No.:	E36,234	E36,235	E36,236	E38,325	E38,326	E38,327
Price:	$5.00	$5.25	$5.50	$6.25	$6.75	$7.25
Replacement Bulb (1)					E36,237	$1.25

CREDIT CARD SIZE FRESNEL MAGNIFIER

3-1/4" L x 2" W, comes with its own protective case. Viewing area is 1-11/16" x 3-1/8" Magnification 3X. Can be custom imprinted in quantities of 5,000 or more (please call for quotation).

E38,456 $1.50
5-49, $1.25 Each
50 or more, $1.00 Each

EDMUND SCIENTIFIC'S NEW GIANT MOON MAP

Our full color giant 24" x 32" moon poster provides a detailed 14-1/2" diameter map of the lunar surface prepared by famed cartographer Antoní'n Rükl. All major features such as craters, mountains, seas, bays, valleys and manned landing sites are identified on the map. The chart also contains additional informative photos provided by astronomers George Lovi and Jay Pasachoff on the phases of the Moon, Latin names to English table and a table of manned and probe landing sites plus basic viewing suggestions. Imprint your name and logo.

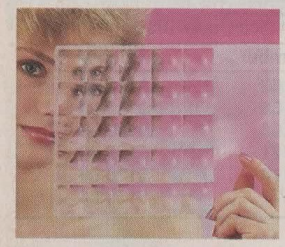
Varnish Coated Poster Stock	E4598	$9.95
Kimdura Plastic Stock	E4599	$14.95

ANTIQUE REPRODUCTION MICROSCOPE

- **Fully Functional**
- **100X**
- **Solid Brass**
- **Ideal Award/ Presentation**

Our detailed reproduction of an early, 19th century German students' microscope is fully functional. Lens elements are optical quality glass and the body is made from machined brass components. "Das Mikroskop" stands approximately 7" tall and weighs 17 oz. A popular desk piece for doctors and scientists. Enscribe name / logo.

Brass Microscope **E35,516 $130.00**



MULTI-IMAGE FRESNEL MAGNIFIER

- **25 Repeat Images**

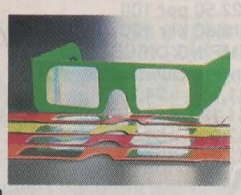
Large 9-3/4" x 7" sheet of pliable .5mm thick acrylic. A 2X magnifier that covers a 3" x 6-3/4"" field lets you examine fine detail. See 25 repeat images of one scene. Mini frames 1-1/4" square.

E36,259 $7.50 3 or more, $6.50 Each

RAINBOW GLASSES

Two diffraction gratings mounted in cardboard frames divide light into different colors. One size. Five different neon-colored frames. Your imprint/ logo.

Pkg. of 6 E42,319 $6.95



EQUILATERAL PRISM WITH POSITIONING BASE

- **Ideal Windowsill RainbowPrism**

Allows you to position our equilateral prism on a windowsill or table to produce a brilliant multi-color spectrum display on walls, floor or ceiling from natural sunlight. Balance the prism on the peak of the triangle's roof, impossible without our specially designed mount. Glass prism is 2" (50 mm) long with 1" (25 mm) faces. Black plastic mount is 3"L x 1-3/8" W X 1-3/8" H.

Prism With Mount **E38,400 $6.95**

ADJUSTABLE 8X MAGNIFIER

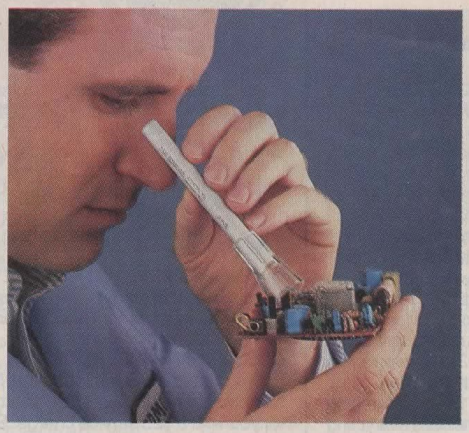
Excellent imaging and high power. Adjustable twist-focus eye lens so the clear acrylic base can rest directly on the subject matter. Optical system is two optical grade acrylic lens elements mounted in a molded plastic base. Includes clear plastic carrying case.

Magnification: 8X **Lens Diameter:** 9/10"
Working Distance: 1" **Field of View:** 1-1/2"
E35,674 $6.25 **3 or More, $5.50 Each**

TINY COMPASSES

Tiny but highly accurate compasses make inexpensive premiums and party favors. Metal and plastic compasses are 7/10" in diameter and 1/4" thick. Floating needle. All 32 compass points are shown.

Bag of 6 Compasses
E40,468 $2.85



EDMUND'S OWN PRECISION POCKET MICROSCOPES

- **Available in 25X or 50X Magnification**
- **Precision Ground Lens System**
- **Rugged Brushed Aluminum Body**
- **Clear Acrylic Easy-Focus Base**

Carry this microscope like a pen. It is only 5" long and has a brushed aluminum finish. Precision glass lens system provides distortion-free detail inspection. Clear plastic mount admits light to subject under view and holds scope at proper focus. Invaluable for the engineer, tool maker, inspector, laboratory technician, researcher, collector and hobbyist. Our pocket microscope makes a wonderful gift for anyone and is reasonable enough in price that you can outfit your entire staff or class.

Magnification	25X E31,853	50X E34, 609
Regular Price	$14.00	$15.00
6-23	$11.00	$12.00
24-49	$9.25	$10.25
50 or	$8.25	$9.25

THE AMAZING SPACE PET OR "CELT "

Originally called "celts" because their curious properties were first discovered by archaeologists. Spin the space pet *the other way* and it will stop, rock up and down on the long axis, and then reverse its spin. Hint: the round edge is an ellipsoid, with its axis aligned at an angle of about five to ten degrees from the main axis of the stone. Angular momentum is conserved. Made of injection molded acrylic . Size: 3-7/8" x 3/4" x 1/2". Imprint your name or logo. **E39,279**

250 - 499 Pieces $1.50 Each
500 - 999 Pieces $1.35 Each
1,000 - 2,000 Pieces $1.25 Each

RADIOMETER SOLAR ENGINE

Radiometer's four vane rotor spins continuously at up to 3,000RPM from heat of sunlight or an incandescent bulb. The silvered model is a hemispherical mirror (1/2 of the glass globe surface) which allows you a panoramic view of everything behind and around you. Each is 5" high, 3" dia. Vane spins on low-friction, needle-point bearing in partial vacuum glass globe.

Silvered Radiometer **E60,529 $12.95**

KEY CHAIN MAGNET

We mounted a strong 7-pound-pull magnet in a plastic handle. The result was a very handy tool that you might want to carry with you everywhere. Key chain.

Pocket Magnet **E36,329 $5.95**
3-9 Magnets $5.25 each 10 & Up $4.85 each
Orders of 200 or more, may be personalized (one line) at no extra charge. **$4.25 each**

MAGNIFY YOUR CUSTOMER'S GOODWILL WITH OUR POPULAR FOLDING INSPECTION MAGNIFIERS

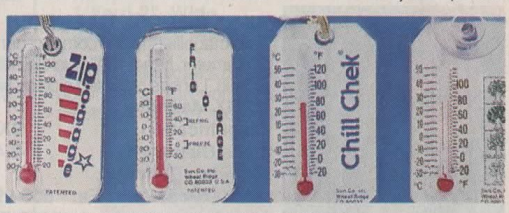
Single element precision glass DCX lens, 1/2" dia. Black anodized machined aluminum frame. 1-1/4" x 1" x 1-1/2" set up; 1/2" high when folded. 1/8" scale etched on inner faces of viewer base. 1" working distance. With 2-3/4" x 2-1/2" leather case, which can be imprinted. Two line limit, 12 letters per line.

# Magnifiers	9X	6X
25-49	E19,312 $16.95	E19,335 $17.75
50-99	E19,314 $15.25	E19,336 $16.25
100 or More	E19,316 $14.50	E19,337 $15.50

9X SPRING-LOADED POP-UP 9X LINEN TESTER

Our new model is spring loaded so that it pops open for fast set-up. Folds flat to only 1/4" thick. Lens dia. 1/2". Single element precision glass DCX lens. Machined aluminum housing with attractive chrome finish. Folds flat to fit in your pocket and a genuine leather case is an option. Scale is etched on the inner face of viewer's base (1/8" increments).

Working Distance: 1"
Dimensions (Set-up): 1-1/4"H x 1"W x 1-1/2"L
(Folded): 1/2"H.
Scale Graduations: 0 to 1/2" in 1/8" increments
9X Tester Only **E38,323 $17.95**
9X Tester With Leather Case **E38,324 $21.95**



KEY CHAIN MINIATURE INSTRUMENTS

Each measures approximately 2" long x 1" wide and weighs only 1/3 oz. Sealed in clear acrylic cases.

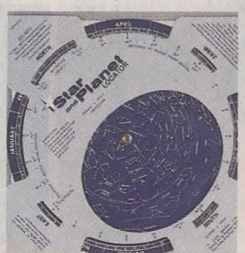
1) Line/Surface Level: Read level directly on surfaces or attach to string for long spans. Key chain ring on bubble level. Not shown. **E36,690 $4.25**

A) Jacket Zipper Thermometer: Attaches directly to jacket zipper. Reads -20° to 120°F or -30° to 50°C. Wind-chill chart on back. Key ring. **E36,691 $4.25**

B) Refrigerator/Freezer Thermometer: Adhesive mount attaches to inside wall. Reads -20° to 60°F or -30° to 20°C. **E36,692 $3.95**

C) Water/Air Sportsman Thermometer: Waterproof to 200 ft. With brass key ring and nylon lanyard. Reads air or water -20° to 120°F or -30° to 50°C. **E36,693 $4.75**

D) Window Thermometer: Encapsulated thermometer with reversible suction cup. Sticks on inside/outside of window. **E36,694 $3.95**



STAR & PLANET LOCATOR

- **Pinpoints Sky Position Of 500 Stars & 9 Planets**
- **Adjusts To The Precise Hour, Day, Month & Year**
- **Popular Teaching Aid**

The ES road map of the heavens shows the location of the stars, constellations and planets relative to the horizon for the exact hour and date you determine. 8-1/2" square star chart was plotted by famous astronomer and cartographer George Lovi. The reverse side of the locator is packed with additional data on the planets, meteor showers and bright stars. Included is a 16-page, fully-illustrated pocket size instruction booklet. Imprint your name/logo.

Star & Planet Locator **E9227 $2.75**
Bargain Pack of 25 **E70,156 $32.95**
Four or More Packs of 25, **$29.95 Each Pack**

NEW TECHNOLOGY CAMERA–ADAPTABLE NIGHT VISION VIEWER

After comparing several units on the market, we find this one superior in overall image quality and ease of use. This second generation viewer is one of the smallest, lightest and highest performance hand held night vision instruments currently available. It utilizes a 18mm second generation, MCP wafer-type image intensifier. This tube provides self-limiting brightness which eliminates blooming and streaking whenever bright objects are in the field of view. Supplied with a 2 × 50mm objective lens and can be coupled to any C-mount lens. This allows various optical configurations using low cost standard "C" mount lenses. The eyepiece is adjustable to compensate for any visual requirement. Shipped with carrying case, battery, and operating instructions.

SPECIFICATIONS:

- **OPTICAL: Magnification:** 2X; **Diopter Range:** +3 to −4.
- **IMAGE TUBE: Type:** MX-9916; **Resolution:** 28Lp/mm; **Photocathode:** S-20R; **Gain:** 7,000 Min. −15,000 Max.
- **MECHANICAL: Length:** 5.3 in.; **Width:** 2 in.; **Height:** 3 in.; **Weight:** 10 oz.
- **ELECTRICAL: Power:** 3 VDC.; **Battery:** 2 "AA"; **Battery Life:** 25-30 Hrs.

Night Viewer **E36,662 $3,650.00**

INFRARED VIEWING DEVICES

Infrared viewers convert near infrared light (invisible) to a green light visible to the human eye. Our viewers feature an image converter that is shockmounted to prevent easy damage. An infrared light source is necessary for imaging/operation in certain applications. Both devices come with objective lens, eyepiece, mount for I.R. light source, instructions and warranty.

APPLICATIONS

Photographic film processing: When used with infrared flashlight or safelight, infrared viewers allow users to see in complete darkness for loading automatic film processors, inspecting film slices, locating retained silver during C-41 processing. Light source is required for this application. Viewing infrared sources: When working with infrared sources such as infrared emitting lasers, laser diodes and LEDs, useful in beam inspection and alignment since these devices are IR light sources themselves an additional source is not required.

SPECIFICATIONS:

Spectral responsivity: visible to 1200 nm
Wavelength of peak response: 800-850 nm
Resolution: better than 50 1p/nm (center)
Field-of-view: 40 degrees
Focus: 8" to infinity
Photocathode: S-1, 18 mm diameter
Lens: 25 mm C-mount

Battery life:	IR Electroviewer—50 hours (typical) IR Goggles—12 hours (rechargeable)
Dimensions:	IR Electroviewer—3" × 2" × 3.5" (exclusive handle) IR Goggles—15" O.D. × 5"H
Weight:	IR Electroviewer—1 lb. IR Goggles—1.5 lb.
Power:	IR Electroviewer—9V alkaline battery IR Goggles—Rechargeable—(includes recharger)

HAND-HELD IR ELECTROVIEWER

Compact and lightweight, designed with a convenient pistol grip handle for simple, accurate operation. Foam-lined carrying case. **E37,826 $1,095.00**

IR GOGGLES

Completely self-contained and designed for comfortable, long term wear, allow full mobility. Rechargeable. **E37,827 $1,350.00**

ACCESSORIES:

Solid State Infrared Flashlight. These light sources illuminate area being viewed with infrared viewers to enable user to see and work in the dark. Consists of infrared light emitting diodes that emit light at 940nm. Useful during color film processing (will not fog most color sensitive films and papers). Range is about 10 feet. IRL7215C slips onto bracket over IR Electroviewer. Contains two C-cell alkaline batteries that last about 20 hours. IRL6100C mounts on horizontal mounting bar of IR Goggle. Connects to goggle. Rechargeable battery pack.

Illuminator for Viewer **E37,828 $190.00**
Illuminator for Goggles **E37,831 $175.00**

37.5nm Visible Light Blocking Filter. Glass filter is opaque to visible light (wavelengths shorter than 800nm) and is transparent to near infrared light (wavelengths longer than 800nm). Useful when observing weak infrared sources with ambient light interference. Filter screws into 37.5 mm filter thread of IR hand-held Electroviewer objective lens. **E37,829 $110.00**

Visible Light Blocking Filter. Replacement glass filter for 5½" darkroom safelight fixture. Used to illuminate darkroom with infrared light. **E37,830 $75.00**

NIGHT VISION SYSTEM

The Dark Invader™ is a compact, high performance, 2nd generation night vision viewer. This unit provides a crisp, detailed, image in low light conditions using standard or telephoto lenses. The Dark Invader™ utilizes a high quality, large (25mm) screen, 2nd generation image intensifier tube which typically amplifies the existing light 45,000X to 55,000 times. The unit is equipped with ABC (Automatic Brightness Control) as well as a manual gain control. This intensifier tube will produce images with the resolving power of 28 line pairs per millimeter or better. This compares in clarity 3 to 4 times sharper than normal television.

SPECIFICATIONS:

- **Eyepiece:** Quick focus 2" multi-coated 32mm erfle ocular
- **Objective Lens:** 135mm f2.8
- **Power Requirement:** Two "N" cell batteries, life averages 24 to 36 hours continuous operation.
- **Dimensions:** Main housing 2⅞" diameter, overall system length 8¼"
- **Weight:** 2 lbs. 5 ozs.
- **Electronic Controls:** On/off and manual gain

Unit comes with batteries, warranty, deluxe aluminum carrying case and instructions.

Night Vision System **E34,572 $4,325.00**

FIND-R-SCOPE® INFRARED VIEWER
● Exceptional Field of View ● High Resolution ● Completely Self-Contained

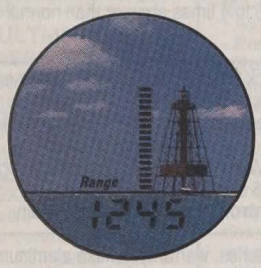
The FIND-R-SCOPE is a handheld infrared viewer that operates in the near IR range. The high resolution image converter tube and high voltage power supply are combined with precision ground optics to allow clear view of things that are otherwise impossible or difficult to see with the naked eye. The FIND-R-SCOPE can be handheld or easily mounted on a tripod for constant positioning, allowing for free use of both hands. FIND-R-SCOPE works by focusing the infrared light reflected by or emitted from a chosen subject onto the image tube, The tube converts the infrared light into a visual image on the P-20 phosphor screen which is viewed through the eyepiece. The power for the tube is supplied by one 1.5V "C" battery converted to 12,000v by the self-contained high voltage power supply. FIND-R-SCOPE has application in a wide range of industries. In the telecommunications field, the FIND-R-SCOPE is used to align fiber optics. Photo labs use it to observe film development and to handle highly sensitive films. Electronic firms inspect infrared light emitting diodes and use it to study laser patterns and alignment. Biologists study nocturnal animal habits; botanists study mold on grain and various leaf and vein conditions. Law enforcement agencies use the FIND-R-SCOPE for surveillance and investigation of erasures and alterations to documents.

SPECIFICATIONS

Focus Range: 6 in. (15.25 cm) to Infinity; **Dimensions:** 6 × 2⅛ × 7 in. (15.25 × 5.4 × 17.8 cm); **Weight:** 22 oz. (625 gm); **Magnification:** 1.1; **Resolution-Tube:** 50 line pairs/mm; **Field of View:** 40°; **Power Requirement:** 1.5v DC (2 type AAA); **Battery Life:** 50 hrs. normal use; **Power Supply Life:** 1500 hrs; **Operating Temp. Range:** −25°F to 115°F (−32°C to 46°C); **Body Material:** polycarbonate; **Finish:** gray and black.

Item	Stock #	Description	Price
Find-R-Scope	E31,074	Monocular, 1.0x, f:1.0 focusing objective lens. Power supply and battery self-contained and included.	$1,395.00
Find-R-Scope with Light Source	E38,173	Same as Item 1, but in addition, having a permanently mounted infrared light source. (Batteries included).	$1,550.00
Close-up Attachment	E38,175	Attaches to Find-R-Scope objective lens to allow for close-up viewing 2" to 6" from subject matter.	$75.00
Filter Attachment	E38,176	Infrared filter attachment fits Find-R-Scope objective lens to filter out the visible light. Increases signal to noise ratio in Laser and LED applications.	$95.00

Chronometer



Rangefinder

ELECTROPTIC MONOCULAR DATASCOPE™ *1 Year Maufacturer's Warranty *

• Fluxgate Compass • Chronometer • Electronic Rangefinder

An innovative electro-optical handheld device that integrates the world's most accurate fluxgate compass, an electronic rangefinder, a digital chronometer and a 5X30 monocular into one sophisticated, waterproof instrument. Just locate the target in the cross hairs and push a button. The Dataview™ transparent digital reticle superimposes bearing, range and time data onto the field of view. Instrument is internally gimballed through ±20° so you do not have to hold it perfectly level for accuracy.

SPECIFICATIONS:

Magnification: 5X
Fully Coated Optics: Yes
Field of View: 9° (472 ft. at 1000 yds.)
Exit Pupil: 6mm
Gimballing: ±20° **Accuracy:** ±0.5°
Calibration: Automatic
True North Display: Yes (user enters variation)
Bearing Memories: 9
Changes in Bearings: Calculated automatically
Rangefinder Type: Electronic ratiometric rangefinder
Units: User determined (metric, english or any other)
Units: Degrees or mils (user selectable)
Changes in Time: Calculated automatically between bearings
Dimensions: 4.5"L x 1.7"W x 2.4"H
Environment: Totally waterproof, fogproof, shock resistant
Power: 3 Duracell D12025 3V lithium batteries (or equiv.)
Power Consumption: Sleep mode: 0.02mA - Display mode: 0.7mA
Bearing Display: 3 modes: instantaneous, averaged or continuous

Objective Lens: 30mm
Fogproof: Yes (gas filled,hermetically sealed)
Temperature Range: 20°C to 70°C
Compass Type: Digital fluxgate
Resolution: 0.1°
Time Readout: 12 or 24 Hour
Time Memories: 9
Clock Type: Quartz crystal real-time clock
Scale: 32 step electronic analog scale
Warranty: 1 year
Weight: 11.5 ounces
Low Battery: Automatic indicator
Battery Life: 6 months to 1 year

Datascope	E38,671	$450.00

8 X 20 SPY SCOPE PROVIDES POCKET-SIZE VIEWING POWER

Handy spy scope stashes in your pocket, purse or vehicle's glove compartment. Just 3" x 2" x 1-1/2" in size. Provides a sharp, distortion-free view. 305 foot field of view at 1,000 yards. Scope features precision, fully coated optics for long life and ease of operation. Very accessible fingertip focusing. Includes neck strap and leatherette case. Scope weighs about two ounces. Just what any sportsman, nature lover needs. Easy to carry around.

8 x 20 Spy Scope Viewer E1568 $49.95
On Sale $39.95

HIGH POWER - LARGE OBJECTIVE BINOCULARS

Higher power requires more light gathering ability; thus, the extra large 60mm objectives. Two models are available: 10 power which can be hand held or the 20 power model which requires a tripod for best viewing. Both models are supplied with a table-top tripod. **$240.00 Each**

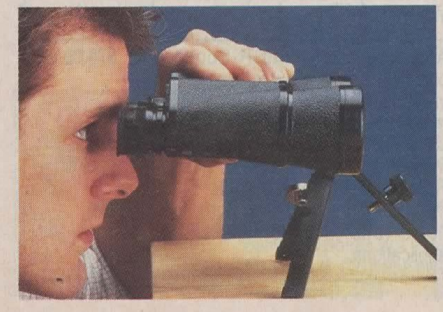
Stock No.	Power	Field of View	Eye Lens Dia.	Eyepiece Type
E1599	10X	5°	20mm	Kellner
E1556	20X	3°	16mm	Erfle

THESE 7 X 50 BINOCULARS ARE SHOCK, WATER RESISTANT

• Bright Yellow Rubber Coating

Bright yellow rubber coating provides a sure grip. Top quality precision ground optics. Center focusing wheel for quick adjustments. 372 foot field of view at 1,000 yards. Shock and water resistant. Convenient fold-down rubber eyecups provide comfort and viewing ease for eyeglass wearers. Binoculars are backed by manufacturer's limited lifetime warranty against defects. With carrying case.

7 X 50 Yellow Coated Binoculars E34,095 $119.95



OUR MOST POWERFUL BINOCULARS

• 10X to 30X Zoom • 63 mm Diameter Objective

Originally designed for police "stake-out" surveillance, these powerful zoom binoculars allow you to survey the general scene at 10X and then zoom-in for critical details up to 30X magnification. At high power (30X) objects must be 150ft. or further away and the tripod stand (included) must be utilized. Mini-tripod stands on table top or attaches to car window. Features: zip-focus power zoom, fully coated optics, porro prism design, and carry case. Focus: 10X-30ft. to infinity, 30X-150ft. to infinity. Field of View: 10X-189ft. at 1,000 yds. Wt.: 41 oz.; 9" H x 8" W.

10X-30X Zoom Binoculars E38,146 $289.00

7 X 50 WATERPROOF MARINE BINOCULARS

• Black Rubberized Armour Finish
• Fully Coated Objective And Eye Lenses
• Easy-Adjust Center Focus

Our waterproof marine binoculars feature large 50 mm objectives and a rugged black waterproof armour finish. The 7 x 50 power-to-objective ratio is the most favored design by the military because it performs best, even in low light conditions, and is easily held stable. The built-in compass model allows you to determine bearing to object viewed and a measuring scale in the field of view lets you calculate distance to or size of object when the one variable is known. Both models feature easy-adjust center focus and come with neck strap, lens covers and carrying case. ES series one year limited warranty applies (see Page 105).

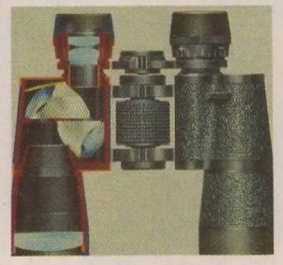
SPECIFICATIONS:	Model	Model
Stock Number:	Standard E39,069	Compass E39,070
Price:	$299.00	$399.00
Magnification:	7X	7X
Objective Lens Dia:	50mm	50mm
Angle Of View:	7.5°	7.1°
Field at 1,000M:	131M	124M
Exit Pupil Diameter:	7.1mm	7.1mm
Brightness:	50	50
Weight:	2.3 lbs.	2.4 lbs.
Size:	6-3/4" High x 8" Wide	

ES BINOCULAR ONE YEAR LIMITED WARRANTY
Edmund Adlerblick binoculars (#36,174, #35,445), our most popular Edmund 7x50 (#1557) and our new Marine models (#39,069 & #39,070) are warranted for one full year from date of purchase against defects in material or workmanship. Return the binoculars, prepaid to ES and they will be repaired or replaced free of charge. This guarantee does not cover damage due to accident or misuse.

EXCEPTIONAL-QUALITY ADLERBLICK BINOCULARS

• An Edmund Exclusive • Fully Tested And Inspected

Edmund Adlerblick binoculars are the first and only binoculars that have passed the exceptional inspection standard of Japan's Telescope Inspection Institute. The E.I.S. is a more severe test of quality on every point than the standard inspection. The higher quality is certified by affixing a gold label "Inspected" instead of the normal "Passed" label.



- **All-metal aluminum construction**
- **Easy-to-use center focus**
- **Quality black leatherette finish**
- **Maximum brightness with BAK-4 prisms**
- **Special glass materials and UV coatings**
- **Pin-sharp image over whole field of view - even at the edges**
- **Extra high eye point - a "must" for eyeglass wearers**

Two Models to Choose From:

7x50 - E36,174 Most ideal for low-light conditions, brightest apparent image with extra-large 30mm eye lenses. Longest eye relief makes these best for eyeglass wearers. **E36,174 $325.00**

10x50 - E35,445; Highest power makes these best for astronomy and demanding surveillance work.

10 x 50 Binoculars **E35,445 $299.00**

SPECIFICATIONS:

	Magnification	Effective Dia. of Objective lens	Angle of View	Field of View at 1000m	Field of View at 1000 yds.	Eyepiece Lens	Eyepoint Distance	Exit Pupil Diameter	Brightness	Prism Type	Body Material	Height	Width	Weight	Stock No.	Price
7 x 50	7X	50mm	7°	122m	122yds	3 lenses	27mm	7.14mm	50.9	BAK-4	Aluminum Die-Castings	7-1/2"	7-1/4"	1 lb. 13 oz.	E36,174	$325.00
10 x 50	10X	50mm	5°	88m	88yds.	3 lenses	18mm	5mm	25	BAK-4	Aluminum Die-Castings	6-1/2"	7-1/4"	1 lb. 9 0z.	E35,445	$299.00

7 X 50 BINOCULARS WITH BLACK ARMOUR FINISH

• Our Most Popular Seller • Sure-Grip Body Coating
• Easy-Adjust Center Focus • Fully-Coated Objective And Eye Lenses

Our famous 7 x 50 binoculars combine the most popular features with an affordable price. Shock absorbing black rubberized coatings over an all metal body provide sure grip handling and weather protection from rain showers and sea spray. Large 50mm precision objectives gather light most effectively to make even some night viewing possible. 7 x 50 is the power to objective ratio most favored by the military. Features easy adjust center focus with diopter correction for right eye lens so binoculars can be correct for any eye combination. Comes with neck strap, lens covers, carrying case and strap. Rugged construction, light gathering ability and precision coated glass optics make this an excellent buy.

SPECIFICATIONS:

Magnification:	7X	**Weight:**	1 lb. 13 oz.
Angle of View:	7°	**Objective Lens:**	50mm dia.
Eye Relief:	17mm	**Field at 1000 Yds.:**	122 M.,367 Ft.
Prism Type:	BK-7	**Exit Pupil Dia.:**	7.1mm
Brightness:	50.4	**Body Material:**	Aluminum Die-Casting
		Dimensions:	6-3/4"H x 7-1/2"W

7 x 50 Binoculars **E1557 $99.95**

GIANT 25 X 100 OBSERVATION BINOCULARS

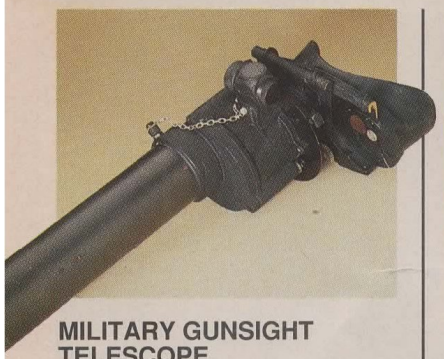
• 4" Diameter Objective Lenses • Full 25X Magnification
• Ideal for Astronomy & Surveillance • Superb Depth Perception

The giant 4" diameter objective lenses provide extraordinary light gathering ability making these binoculars ideal for low-light surveillance and deep space astronomy. The entire optical system is fully coated for minimal light loss and stray light reflection/interference. Center focus system allows for fast, smooth focusing with right eye diopter adjustment to compensate for eye differential. Field of view is a full 2.6 degrees of field and the depth perception within the image is incredible. Comes complete with heavy-duty aluminum tripod mount adapter and rugged aluminum carrying case. Binocular should be tripod-mounted because of high power and weight (a heavy-duty photo or telescope tripod is recommended).

SPECIFICATIONS:

Magnification:	25X	**Objective Lens Dia.:**	100mm/4"
Field of View at 1000 Yds.:	135 ft.	**Field of View:**	2.6°
Brightness:	16	**Exit Pupil:**	4mm
Dimensions:	14"L x 10"W	**Weight:**	8.75 lbs.

25 x 100 Binoculars **E38,715 $1,750.00**



MILITARY GUNSIGHT TELESCOPE

7X erect image telescope with 50mm objective lens and click stop diopter point focus. Made by Canadian Kodak LTD. (Pat. #G376). Crosshair reticle and 2 filters (polarized & yellow) in rotatable eyepiece cover. Eyecups are interchangeable to allow right or left eye viewing. All brass construction (weighs over 11 lbs.), plus coated optics. Wooden storage case. Used genuine military surplus, good condition. Approximately 15" long x 2-3/8" dia. barrel.

Gun Sight Telescope
E36,805 $159.00

U.S. GOVERNMENT GUNSIGHT TELESCOPE

Originally designed for military weapons fire control, this well-built instrument can be used for alignment on your optical bench in the lab, or in the field for aligning posts, towers, etc. Waterproof. Power is one to one, fixed focus from 15" to infinity. Engraved fine line 90° cross line reticle can be edge illuminated with your light source. Achromatic optics produce extremely flat field. Eye lens 21mm dia. with 50mm eye relief. Objective lens 20mm clear aperture dia. All brass construction, painted black. 13-1/2" L. x 1" dia. Excellent condition with fitted wood case.

Gunsight Telescope E37,683 $85.00

SECURITY COMPONENTS

A) Both models feature loop-through with switchable 750OHM termination and front panel controls.

SPECIFICATIONS:	SSM - 920 SONY 9"	SSM - 121 SONY 12"
Video signal input	EIA STD	EIA STD
SYNC	Negative	Negative
Power Input	120V AC/27W	120V AC/30W
Horizontal Resolution	+700 Lines	+700 Lines
Video Input	BNC Type	BNC Type
Video Output	BNC Type	BNC Type
Dimensions	8-3/4"W x 9-1/2" H x 9-3/4" D	11-/34" x 12"H x 11-3/4"D
Weight	13 Lbs.	21 Lbs.
Stock Number	E39,343	E39,344
Price	$175.00	$255.00

B) Sony Low Lux 0.3 B/W Camera 12VDC transformer/power supply included. Requires a "BNC" connector,(not included). **E38,898 $595.00**

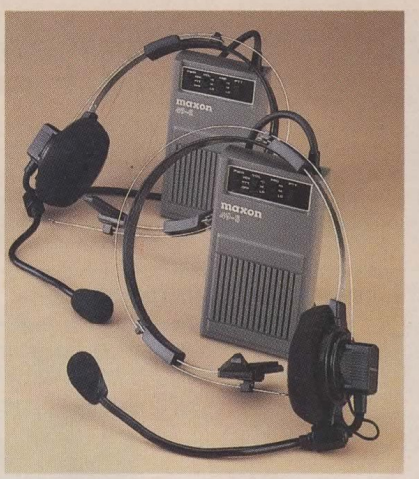
C) Connectors: Double "BNC" Type Cable (BNC To BNC) 6 foot cable with "BNC" terminal at each end for use with the above models. **E38,903 $18.00**

WATEC MONOCHROME CAMERA

• Low Light 0.2 Lux • Compact Camera With Remote Power Supply

WATEC CAMERA E39,244 $450.00

SPECIFICATIONS:			
Signal Type:	NTSC	Vertical Sync. Freq.:	60Hz
Pick Up Element:	CCD image sensor		
Number of Pixel:	510H x 492V		
Unit Cell Size:	12.7 um(H) x 9.8 um(v)		
Resolution:	350 TV-lines or more horizontal		
S/N Ration:	More than 46dB		
Minimum Illumination:	0.2 Lux Fl. 2		
Video Output:	1Vpp 75Q / BNC type		
Horizontal Sync. Freq.:	15.73KHz		
Clock Frequency:	28.636MHz		
Power Supply:	12V DC (11~14V) 200mA max		
Camera Head Dimension:	1-3/8"W x 1-3/8"H x 2-3/4"D		



TWO-WAY COMMUNICATION WHILE YOU WORK OR PLAY

Two-way FM receiver transmitter communications system has a half-mile range. Communicate with work partners. Keep in contact with hunting partners. Automatic message transmission. . . just speak into the headset or use manual mode. Adjustable sensitivity switch eliminates false triggering caused by ambient background noise. Entire unit weighs about nine ounces. Headset has foam cushion earpiece and quality speaker element. Condenser mike has protective wind screen on movable boom. High-Medium-Low audio adjustment. Whip antenna. Transmitter clips onto belt and provides crystal-clear reception through crystal controlled dual conversion superheterodyne receiver. Frequency range: 49.820-49.890 MHz. Service area: 1/4 mile (400 meters) average, up to 1/2 mile under optimum conditions. Current Drain: 13.5mA-15mA (standby); 60mA-65mA (receive); 70mA-75mA (transmit). Intermediate Frequency: 1st-IF 10.7MHz; 2nd-IF 455KHz (two stage ceramic filtering). Sensitivity and Squelch Open sensitivity: 0.5uV Min. Spurious and Image Rejection: 20dB Min. Frequency Stability: 2KHz. Headphone Impedance: 320HM. Audio Distortion: 10 percent max. Power: Input 100mW; output 40mW. FCC maximum 10,000uV per meter at three meters. Antenna Impedance: 500HM. Operated by single nine volt battery (not included). Unit measures: 4-9/16"x2-1/2"x15/16". Any number of units can be operated at one time on one channel. ***Minimum of two units required.***

Receiver/Transmitter E33,105 $59.95 Each

ECONOMICAL B/W VIDEO SURVEILLANCE SYSTEMS SECURITY/SURVEILLANCE SENTRY UTILIZES REGULAR TV

Monitor almost any area you want with this miniature security/surveillance system. Connects to any television set, large or small, black and white or color. For homes, offices, stores. TV Sentry includes miniature CCTV camera (9-1/2" long, 2" high and 4-3/4" wide) that has built-in light compensation system and operates on television channels 3 or 4; three-way mounting bracket and 50 feet of plug-in coaxial cable that connects camera to television set. Mounting bracket head pans 360 degrees horizontally and 90 degrees vertically. Installs in minutes using four screws. Mount is 7-3/8" high and 5-1/2" long. Camera can be mounted on wall, ceiling or table. Camera produces clear, sharp pictures under almost any conditions. Installation is as simple as installing an antenna to a television set. Camera weighs about 1-1/2 pounds. Can also be connected to a video cassette recorder for making video tapes. With non-grounded AC adapter. Camera outer case has standard 1/4"-20 thread on top and bottom for attachment to any standard mounting bracket.

TV Sentry	**E33,140**	**$289.00**
TV Sentry With Sound. Same unit as above, but with a built-in microphone in the camera unit, which will transmit one way sound as well as video over the same coaxial cable. Sound level can be adjusted on your TV.		
TV Sentry With Sound	**E38,093**	**$415.00**
A) Weatherproof Housing for TV Sentry Models	**E33,141**	**$69.00**
B) Extension Cables: Cables with jack-plug terminals.		
25 Ft.	**E37,766**	**$24.00**
50 Ft.	**E37,767**	**$29.00**
100 Ft.	**E37,768**	**$36.00**
C) Standard Lenses (For All Models)		
Ultra Wide Angle 4.8mm f.l.	**E37,769**	**$289.00**
Wide Angle 8mm f.l.	**E37,770**	**$79.00**
Telephoto 50mm f.l. f1.8	**E37,771**	**$160.00**
D) Auto-Iris Lenses (For Mini-Camera Only)		
Ultra Wide Angle 4mm f.l.	**E37,772**	**$425.00**
Wide Angle 8mm f.l.	**E37,773**	**$395.00**
Normal Angle 16mm f.l.	**E37,774**	**$350.00**
Telephoto 50mm f.l.	**E37,775**	**$445.00**

BINOCULAR TO TRIPOD ADAPTERS

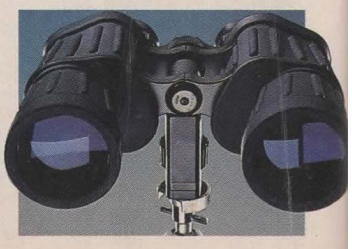
Our tripod adapters allow you to affix your binoculars to any standard photo tripod with a 1/4"-20 std. screw.

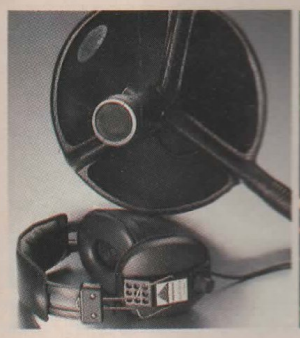
A. TRIPOD ADAPTER/TABLE-TOP TRIPOD

A small table-top tripod in itself, or can attach to full photo tripod. Most new binoculars have a built in 1/4"-20 socket, usually at the front end of the center post hidden by a screw off cover. This mini-tripod allows you to access this socket in the confined space between the objective lens bodies. **E34,277 $29.95**

B. TRIPOD ADAPTER FOR UNOBSTRUCTED CENTER POST BINOCULARS

A "C" type clamp that affixes to the center post of your binocular (post diameters up to 1/2") and then screws onto tripod head. **E31,605 $29.95**





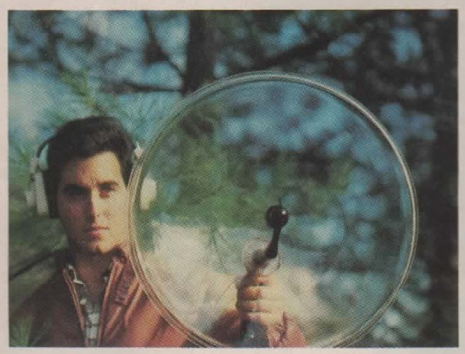
BIONIC EAR WITH PARABOLIC BOOSTER HEAR A WHISPER AT 100 YARDS!

The "Bionic Ear" will compensate for your limited hearing. It was designed with professional security in mind. This portable electronic listening tool weighs under 1-1/2 pounds with the headphones included. It is the size of a flashlight, and is powered by one common 9 volt battery. The Bionic Ear has an omnidirectional microphone that allows it to pick up sounds from all directions, with the dominant sounds coming from the direction that you point it; just like your own hearing, only much more powerful. It does not eliminate background noises, so a loud and steady background noise will drown out a soft sound in the foreground. The Bionic Ear is designed with safety in mind as well. It contains an automatic shut-off circuit that tests all incoming sounds and shuts off momentarily if the sound could harm your hearing. The Bionic Parabolic Booster is designed to make the Bionic Ear even more powerful, and much more directional. With this accessory the Bionic Ear becomes a directional listening tool, allowing you to pinpoint where a sound is coming from. It also eliminates much of the surrounding background noise, providing you with very clear reception.

Applications: Bird watching, security, law enforcement, hunting, and hearing impaired.

Features: On/off and power gain knob, individual volume controlled earphones.

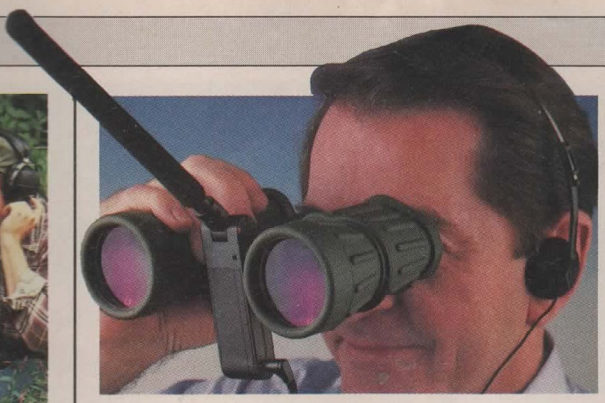
Bionic Ear & Booster **E33,595 $129.00**



PULL IN VOICES UP TO THREE-QUARTERS OF A MILE AWAY WITH OUR ELECTRONIC PARABOLIC MICROPHONE

Magnifies signals 100 times that of regular omnidirectional microphones. The 18-3/4" plastic shield reflects soundwaves to an ultrasensitive, moisture-sealed microphone. Low frequency filter cuts background noise under 150 cycles. Microphone automatically cuts off during sudden bursts of loud noises. 250 to 18,000Hz cycle frequency response. Nominal 150 to 600 OHMs output impedance. Low frequency tantalum wind filter eliminates unwanted sounds below 150Hz. Output level: 40dB. Uses two nine volt batteries (not included) which are housed in an easy grip handle which also has a 1/4"-20 mount for tripod use. Lightweight headset has cushioned earcups which seal out extraneous noise. Shielded output cable. Vinyl covered headset is fully adjustable to accommodate any user. 7 foot cable. On/off switch. With vinyl carrying case. Pick up the slightest of sounds in almost any terrain and under almost any weather condition.

Parabolic Microphone **E1649 $725.00**

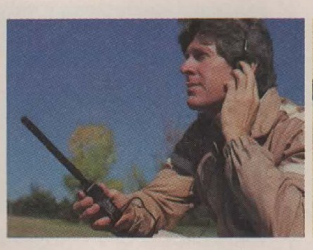


THE DISCOVERY SOUND AMPLIFIER

- **For Sports Fans, Nature Enthusiasts**

Ultra-lightweight and compact directional microphone and headset amplifies by 50 decibels at a distance of 200 ft. Light enough so you can mount this microphone on your binoculars for surveillance or nature study. Weighs 3.5 ounces, 12" long overall, 7" microphone. Powered by 1"AAA" battery, included. Frequency response 200Hz to 8000Hz. Output level 49db's to 114 db's maximum. Includes padded microphone, amplifier and lightweight headphones. The sound amplifier can be used alone or may be attached to most binoculars .

Discovery Sound Amplifier **E38,042 $49.95**



UNDERWATER HYDROPHONE

Kit includes amplifier, underwater microphone (transducer), 20 ft. cable, mini headphones and instructions.

SPECIFICATIONS:

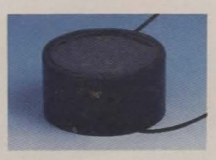
Transducer (Underwater Microphone)

Frequency Response: 10 to 6000 Hz. 54 db. with 51 db. in 10 to 2000 Hz. range. Rolloff at greater than 12 db. per octave above 7000 Hz.
Internal Capacitance: Approx. 15,000 pf.
Pickup Pattern: Omnidirectional
Operating Depth: 300 feet or less. Maximum depth without damage is 360 feet. **Cable:** 20 feet standard.

Amplifier

Input Impedance: 4.7 Megohms across 100 pf.
Output Power: Maximum 0.5 watts R.M.S.
Frequency Response: 52 db., 100 Hz. -20 Khz.
Current Drain: No Headphone-6 milliamperes, with 20 ohm headphone (normal volume)-10 milliamperes; (loud volume)-20 milliamperes
Battery: 9V snap type (alkaline type recommended)
Voltage Gain: At headphone/speaker jack (full volume) 70 db. at tape jack (full volume) 23 db.
Case: Plastic , 1x2x3 inches, 5 ozs. with battery.

Hydrophone **E38,095 $240.00**



HYDROPHONE MICROPHONE HEAD

- **Build Your Own Hydrophone System**

Rubber encapsulated hydrophone head can be wired to any amplifier just like a microphone to create an underwater sound monitor. Two 8" leads and instructions.

SPECIFICAIONS:
Frequency Response: 10 to 6000 Hz. 64 db. with 61 db. in 10-2000 Hz. range. Roll off at greater than 12 db. per octave above 7000 Hz. **Impedance:** Low, will operate into both high and low impedance inputs. Internal capacitance approximately 15,000 pf. **Operating Depth:** 300 feet or less. Maximum depth without damage: 360 feet

Hydrophone Microphone Head **E41,759 $22.95**

ASTROLIGHT VIEWER LIGHT AMPLIFICATION SCOPE

- **High Performance Image Intensifier**
- **Photo/Video Adaptable**
- **7X Magnification**
- **135mm F.L. - f2.8 Objective Lens**

The Astrolight Viewer is a light amplification device that, when operated at very low light levels, yields bright, sharp images of objects, persons, samples, etc. under observation. Based on a high performance image intensifier that offers high luminous gain and high resolution despite its compact size. The fluorescent green light output can be observed by the naked eye via an adjustable eyepiece, can be photographed with an SLR camera or video recorded with a CCTV camera (adapters not included). A LO/HI gain control allows the user to adjust the light gain to the level required. Includes 7X eyepiece, pistol grip, alkaline batteries, foam-lined case, operating instructions, warranty.

APPLICATIONS:

Night Vision and Low-light Photography: When used with objective lens, enables user to view and/or photograph in very low light levels. Increases the effective speed of objective lenses and reduces the exposure time required for photographs. Also allows for video recording at low light levels.

Astro-Photography: Intensify the light from astronomical bodies. Increases apparent telescope aperture and decreases exposure time for photographs (reduces necessity of clock drive).

Microscope Fluorescence Imaging: Intensify the fluorescent emission of objects under microscope observation.

SPECIFICATIONS:

Intensifier Type: 25mm 2nd generation, MCP intensifier with automatic brightness control.
Luminous Gain: 30,000 fL/fc (minimum)
Resolution: 28-32 line-pairs per mm (center)
Spectral Responsivity: Visible to 850nm
Objective Lens: 135mm F.L./f2.8
Eyepiece: 7X Magnification
Lens Mount: 1" Threaded C-type
Dimensions: 5" L x 4" H x 2.75" W (exclusive of handle)
Weight: 1.75 lb. (without lens)
Power: two N-cell alkaline batteries
Battery Life: 30 hours (typical)

Astrolight Viewer System **E38,208 $3,395.00**

ACCESSORIES:

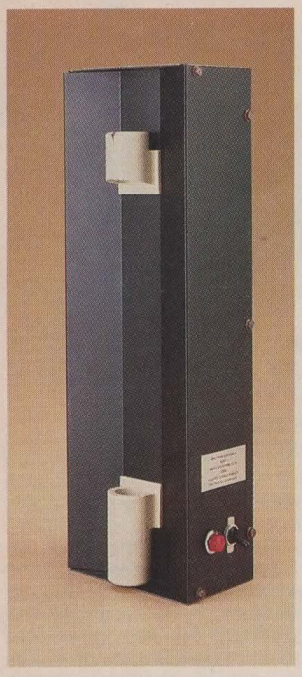
Telephoto Objective Lens. Telephoto Lens, focal length 135mm, f2.8. **E38,209 $299.00**

Viewer-to-SLR Camera Coupling Tube. Couples viewer to single-lens-reflex camera in order to produce 35mm photographs of viewer output. Does not require removal of viewer eyepiece or SLR objective lens. Screws directly into 52mm filter thread of SLR camera objective lens (not supplied). **E38,210 $395.00**

Viewer-to-TV Coupler. Relay lens assembly designed to transfer viewer output to any 1" C-mount CCTV camera for low-light level video recording. Screws onto back-end of Astrolight Viewer. **E38,211 $350.00**

Telescope Adapter.
For mounting viewer onto telescope to intensify light from astronomical objects. Adapter screws into lens mount opening of Astrolight Viewer. On telescope, replace 1.25" O.D. eyepiece. Also can be used to attach any C-type mount TV camera to telescope. **E38,212 $49.00**

Microscope Adapter.
For mounting viewer onto microscope to intensify light from microscopic objects such as during fluorescence imaging. Screws into lens mount of Astrolight Viewer and replaces 1" O.D. microscope eyepiece. Also can be used to attach any 1" C-type mount TV camera to microscope. **E38,213 $49.00**

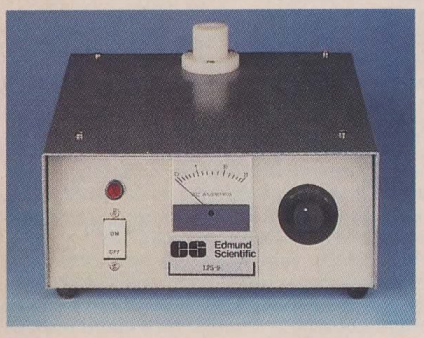


SPECTRUM ANALYSIS

Power Supply: For delivering the voltage necessary to light spectrum tubes and an integral stand to hold them. Specially designed 5000 V, 7mA maximum transformer with an on/off switch and heavy-duty, 3-conductor 6 ft. cord set. 3-1/8" x 6-1/4" x 21". **E71,559 $129.95**

Spectrum Tubes: 100mm long tubes.

Number	Description	Price
E60,906	Hydrogen	$16.50
E60,907	Helium	16.50
E60,912	Oxygen	16.50
E60,909	Argon	16.50
E60,911	Nitrogen	16.50
E60,910	Neon	16.50
E60,913	Water Vapor	16.50
E60,914	Carbon Dioxide	16.50
E60,915	Krypton	18.95
E60,916	Xenon	25.50
E60,908	Mercury Vapor	17.95
E37,408	Bromine	18.95
E37,409	Iodine	18.95
E37,410	Carbonic Acid	18.95
E37,411	Air	16.50
E37,412	Chlorine Gas	18.95
E37,413	Deuterium	25.50



OSRAM SPECTRUM LAMPS & POWER SUPPLY

Power Supply & Adapter Operate All Osram Lamps. Use for lamps below. Features a power select dial and includes medium pre-focus socket holder. Shield and wide scale meter 115 VAC, 50/60 Hz, 7.5 amps. Wt. 30 lbs.

E85,239 $495.00

Line Spectrum Lamps By Osram Meet A Variety of Needs.
102mm x 21mm O.D. 9-pin DIN base. Light center length of 43mm #1mm, center of arc to bottom of base with no readjustment during operation. Outer bulb lights emit spectra.

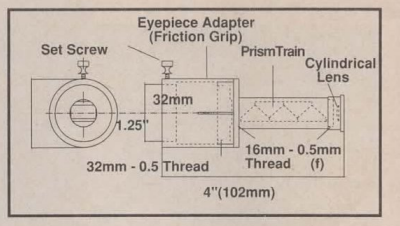
Cadmium	E41,245*	$245.00	Cesium	E41,244	$460.00
Merc. Hg 13	E41,240*	$320.00	Helium	E41,243	$290.00
Potassium	E41,238	$370.00	Sodium	E41,237	$265.00
Rubidium	E41,235	$495.00	Neon	E41,236	$290.00
Thallium	E41,234	$460.00	Zinc	E41,233	$230.00

*Outer envelope window permits S.W. radiation.

LABORATORY SPECTROSCOPE TABLE TOP

Spectroscope is a replica diffraction grating instrument with a scale to show approximate wavelengths in Angstrom units. The housing is a single-piece aluminum casting mounted on a nickel plated steel post and supported on a sturdy cast iron tripod base. In use, the white face reflector is positioned to give a small amount of back lighting to a photographic film scale so that it may be clearly seen against the superimposed image of the spectrum. To observe solar spectrum, use a cloud and the adjustable slit. Will detect Ca, Pa, Sr, Li, K, Na, Rb, Cu, etc. by flame emission. As slit is closed, prominent Fraunhofer lines appear. In lab, source is placed in front of slit and light from lamp directed in scale. 16" x 10" x 9". Weighs 7 lbs.

Spectroscope E72,411 $255.00



AMICI PRISM STAR SPECTROSCOPE

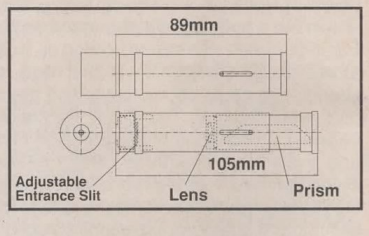
• 1nm Resolution (10A) • Good For Point And Line Sources

Designed for use with astronomical telescopes to obtain star spectra, the amici prism-type spectroscope may also be adapted for laboratory applications. The optical system consists of a train of 5 amici prisms and a cylindrical lens. Three cylindrical lenses are provided with different focal lengths to adapt the system to different telescope configurations. Comes with adapter to accept 1.25 inch American standard astronomical eyepieces. We recommend a low power eyepiece, such as our 25 mm Orthoscopic (#30,407) or a 28 mm RKE® (#30,787). (See Optical Eyepieces). 1nm resolution is powerful enough to separate double D line. This unit is not intended for solar and lunar spectra. Instructions included.

SPECIFICATIONS:

Resolution: 1nm (10A) **Dispersion Angle:** Between C & G', 9°
Fraunhofer Line Range: (C) 656.3 nm to (G') 434.0 nm

Amici Prism Star Spectroscope E50,023 $379.00



HANDHELD SPECTROSCOPE

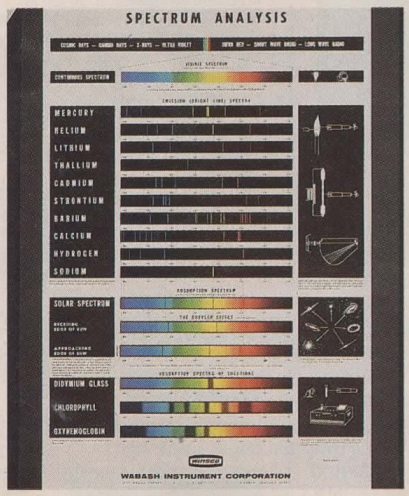
• Precision Prism-Type • Variable Slit, Adjustable Focus

Ideal for classroom demonstration and quick laboratory observations, our easy-to-use, palm-sized (4-3/16" L x 7/8" Dia.) instrument provides fast, accurate spectra of any visible light source. Useful for both emission and absorption spectra. Features a precision, 5-element prism train and lens optical system housed in a stainless steel tube. Adjustable slip-type focus and optical slit. As slit opening diminishes, contrast decreases but resolution increases.

SPECIFICATIONS:

Resolution: 4 nm (40Å) **Dispersion Angle:** 24° (approx.)
Fraunhofer Line Range: 390.0 nm to 760.0 nm (visible spectrum)
Visually, spectrum appears approx. 1.25" wide at 3" from eye.

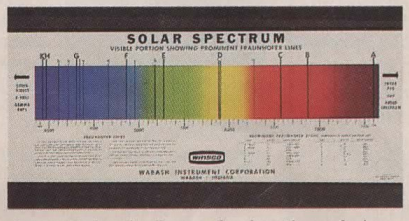
Handheld Spectroscope E42,586 $190.00



SPECTRUM ANALYSIS CHART

A full color chart for teaching the principles and applications of spectrum analysis. Unit is approximately 27" wide x 47" long, and is printed on heavy chart paper with a varnish overcoat. Features: the electro magnetic spectrum and the portion occupied by the visible spectrum; emission or bright line spectra of ten elements; solar spectrum and Fraunhofer lines; Doppler effect; absorption spectra of solutions. Line drawings illustrate the methods of producing various spectra and practical applications of spectrum analysis. Scales under each spectrum show wavelengths in Angstrom units.

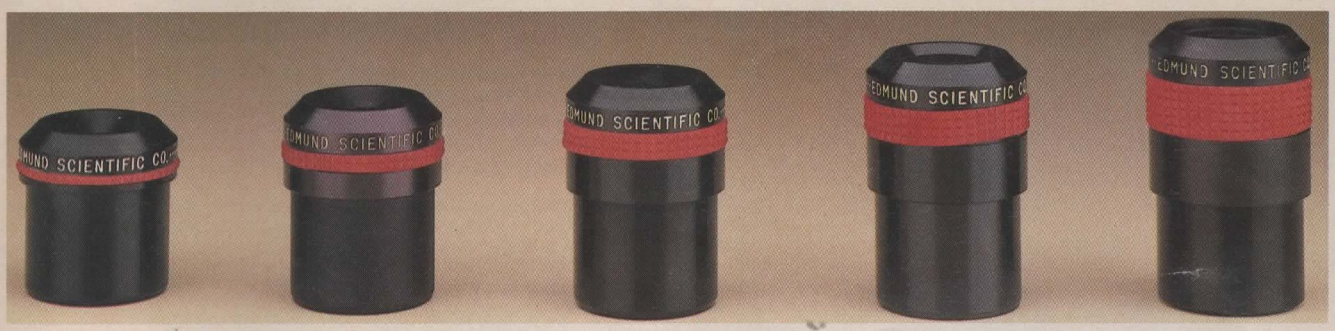
Spectrum Analysis Chart E36,423 $13.95

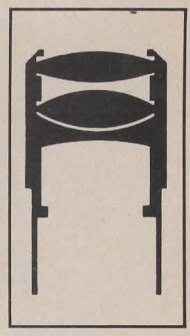


SOLAR SPECTRUM CHART

A full color chart of the solar spectrum on heavy chart paper with varnish overcoat, approximately 10-1/2" x 28". The most prominent Fraunhofer lines and their wavelengths are shown in Angstrom units. These lines are used as reference points in determining indices of refraction of glass and liquids. Comes with metal binding strips with hanging tabs which may be removed for framing.

Solar Spectrum Chart E36,424 $10.50





Rarely has innovation been so successfully applied as in the development of the RKE® line. Our goal was to exceed the performance of popular American and foreign eyepieces and to reduce the price of a quality eyepiece by as much as one-half. By using computer analysis, we were able to develop a moderately-priced, three-element system which outperforms designs using four or more optical elements. The exclusive design of the RKE® eyepiece family coupled with the quality of its optics admits more light, is free from false colors and offers a sharply-focused, wide-field view.

"The RKE® eyepiece yields incredibly good definition over the entire field of view. It outperforms eyepieces costing twice as much."
— Terry Dickinson
Noted Science Writer

Specifications:

RKE® Eyepiece	8mm	12mm	15mm	21mm	28mm*
Effective Focal Length	8.0mm	12.0mm	15.0mm	21.5mm	28.7mm
Eye Relief	8.2mm	10.7mm	13.4mm	18.8mm	24.5mm
Apparent Field	45°	45°	45°	45°	45°
Field Stop Diameter	6.6mm	9.7mm	11.9mm	17.3mm	23.3mm
Barrel Outer Diameter	1¼"	1¼"	1¼"	1¼"	1¼"
Stock Number	E30,820	E30,940	E30,819	E30,941	E30,787
Price	$48.95	$48.95	$48.95	$48.95	$48.95

*Note: The 28mm RKE® includes a rubber eyeguard for comfortable viewing.

Formulated by Dr. David Rank to provide sharply-focused images over the entire field of view, each parfocal eyepiece has a field stop set precisely at the focal plane to yield sharp field border. Manufactured in our own optical facilities, these eyepieces are made with the finest high-index optical glasses and anti-reflection coatings. Each is housed in a black aluminum cell and barrel threaded to accept standard astronomical filters. The red rubber ring permits easy identification and a sure grip when being used in the dark. The 28mm eyepiece includes a rubber eyeguard for comfortable viewing.

System Magnifications:

RKE® Eyepiece		Astroscan® 2001		Three-Inch F/6		Edmund 60mm F/8	
		Eye-piece	Barlow & Eyepiece	Eye-piece	Barlow & Eyepiece	Eye-piece	Barlow & Eyepiece
8mm	E30,820	56X	140X	56X	140X	61X	152X
12mm	E30,940	37X	93X	37X	93X	40X	101X
15mm	E30,819	30X	74X	30X	74X	32X	81X
21mm	E30,941	21X	53X	21X	53X	23X	58X
28mm	E30,787	16X	40X	16X	40X	17X	43X

SPECIAL BARGAIN! COMPLETE KIT WITH CASE
This great bargain includes five RKE® eyepieces plus 2.5X Barlow, all custom-fitted in a cushioned, foam-insert case. Durable polyethylene case measures 12¼" × 6" × 4". A $354.00 value.
Eyepieces In Case E30,942 $320.00
Case Only (no eyepieces included) E31,041 $19.95

THE EDMUND 2.5X RKE® BARLOW LENS
The RKE® Barlow Lens is designed to increase the magnification of equipment systems using standard 1¼" focusing mounts and eyepieces. Computer ray-traced to minimize aberrations, the lens is anti-reflection coated and fully color-corrected. Featuring one-piece construction, the RKE® Barlow eliminates the need to use short focal length eyepieces or long, cumbersome telescope tubes.
2.5X RKE® Barlow E61,186 $89.95

SPECIFICATIONS:
Magnification: 2.5X, fixed position.
Optics: Two-element, achromatic, coated negative lens. 1.9mm focal length, high-density glass.
Tube: Black anodized aluminum, finely-grooved along the optical path to eliminate reflected light.
Compatibility: Fits 1¼" I.D. focusing tubes. Accepts 1¼" eyepieces. Parfocal with RKE® eyepieces.
Length: 7" overall.

ERFLE EYEPIECES

A) 32MM F.L. ERFLE STANDARD 1¼" O.D.
Especially designed for extra-wide fields with good correction of all aberrations. Comprises three achromats. Apparent field of view 50°.
E36,172 $115.00

B) 20MM F.L. ERFLE STANDARD 1¼" O.D.
Extremely wide 65° field of view and excellent correction of all aberrations. Provides comfortable viewing on most telescopes and finder scopes. Standard 1¼" O.D. Streamlined modern design with handsome chrome and black finish.
E60,495 $84.95

IMAGE ERECTORS

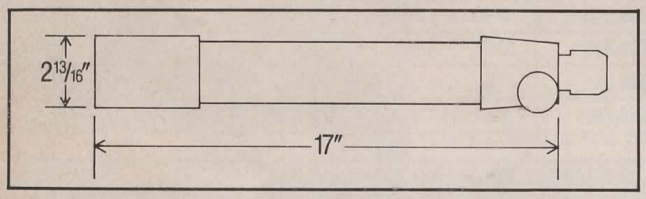
PRISM STAR DIAGONAL
For refractor telescopes which use standard 1¼" O.D. eyepieces. Useful for right angle viewing of high sky objects. Right angle prism, chrome plated tubes, wrinkle finish aluminum body, 1" clear aperture, 3⅜" optical path.
E70,077 $99.00

90° ANGLE AMICI PRISM ERECTOR
Corrects image right-side-up and left to right. Bends line of sight through 90° angle for viewer comfort using shorter tripod mounts. Std. American size accepts 1¼" dia. eyepieces.
E50,247 $69.95

IN-OPTICAL-PATH ROOF PRISM ERECTOR
This well-crafted precision optical instrument fits within any standard 1¼" I.D. focuser tube and allows right-side-up vision, correctly oriented left-to-right. Utilizes Pechan Roof Prism and a negative lens to increase working distance. Black anodized aluminum housing measures 1¼" diameter, 1⁹⁄₁₆" long. Supplied with tube measuring 1¼" I.D., 1⁵⁄₁₆" O.D., 3½" long. Clear aperture of system is 8mm. Recommended for Astroscan® and most reflector-type telescopes.
E2007 $99.00

STRAIGHT-THRU PECHAN PRISM ERECTOR
Two-element Pechan Roof Prism system rectified image right-side-up and correctly orients left to right. Black anodized aluminum cell is 3¼" long × 2" diameter. Ends of housing are 1¼" O.D. and 1¼" I.D. to fit American Standard telescope focusers and eyepieces. Clear aperture of system is ½".
E6004 $110.00

RUBBER EYEGUARDS
Flexible rubber eyeguards cut ambient light and reflections and provide viewer comfort for maximum visual effect. Assure proper eye-to-lens positioning. Three sizes available. Stretch to fit many eyepieces.
1½" to fit 2" and Larger Eyepieces E60,099 $8.25
1⅛" to fit 1¼" Std. Eyepieces E60,100 $7.00
.95" to fit 0.966" Japanese Std. Eyepieces E34,762 $6.75



TRIPOD-MOUNTED 60MM F/8 REFRACTOR . . . PRECISION-CRAFTED FOR LAND AND SKY OBSERVATIONS

- **The Ultimate In High-Precision Optics...Resolves To 1.9 Seconds Of Arc**
- **"Rank" Achromatic Objective Lens...Formulated Expressly For Edmund Scientific By Renowned Optical Designer Dr. David Rank**

Explore Earth, Sea and Sky! Traditionally telescopes were designed for either astronomical or terrestrial use. Now, Edmund Scientific proudly offers a superbly-crafted, American-made refractor that is admirably suited to both functions.

A Terrestrial Telescope...its compact, rugged design makes it an ideal companion on nature outings or on your balcony or patio. You'll see incredibly sharp and detailed images of birds, flowers and insects.

An Astronomical Telescope...its state-of-the-art optical system puts the wonders of the universe at your fingertips—lunar craters, Jupiter's satellites, Saturn's rings, tinted double and multiple suns, star clusters, nebulae and even some of the brighter galaxies.

A Telephoto Lens...with accessory attachments, a 35mm SLR camera can be coupled with the 60mm f/8 telescope to record on film your land and sky targets.

Wide Field...the 60mm f/8 provides a 1.4° field of view at 32X, almost three times more field than traditional 60mm refractors.

Equatorial Mount...allows the observer to trace the motion of sky objects. All metal construction for durability and vibration-free viewing.

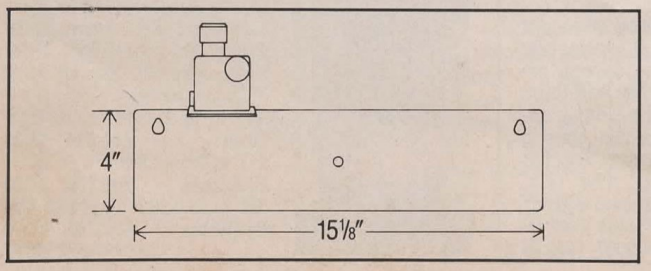
60mm f/8 Telescope With Equatorial Fork Mount	E31,611 $399.00

SPECIFICATIONS:

Objective: 63mm diameter f/8, 60mm clear aperture, Rank achromatic cemented doublet, MgF anti-reflection coatings, 486mm (19") focal length, 1.9 arc second resolution.
Eyepiece: 15mm e.f.l. RKE® , 45° apparent field, standard 1-1/4" O.D. barrel.
Magnification: 32X with 15mm RKE® to 150X with optional eyepieces & Barlow lens.
Field of View: 1.4° at 32X. **Finder:** 5X with 24mm objective, crossline reticle.
Image Erector: precision amici roof prism corrected to better than six seconds of arc for diffraction-limited resolution. Corrects image right to left and bends light through a 90° angle for viewer comfort.
Focuser: smooth rack & pinion, accepts standard (1-1/4" O.D.) eyepieces and accessories.
Coatings: anti-reflection throughout.
Mount: thick-wall aluminum legs, 1/4" steel fork, 56" height overall.
Weight: 7 lbs. **Packaging:** heavy duty shipping carton with foam inserts

Optional RKE® Eyepieces See Page 108.

RKE® System Magnification	28mm 17X	21mm 23X	15mm 32X	12mm 40X	8mm 61X
Stock Number	#30,787	#30,941	#30,819	#30,940	#30,820
Magnification w/RKE® Barlow #61,186	43X	58X	81X	101X	152X



ECONOMICAL FIRST TELESCOPE...EDMUND'S 3" F/6 REFLECTOR

- **Performance That Will Reinforce And Develop The Child's Interest**
- **Wide 1.6° Field Makes It Easy To Find Sky Objects**
- **30X Magnification With 15mm RKE® Eyepiece Is Ideal For Both The Moon And Deepsky Objects**

Adventure Into The Night Sky...look with awe at the vast craters of the moon, brilliant Nebula, Saturn's rings, Jupiter's many moons and deep space star clusters.

Educational Design...we studied the basic beginner telescopes on the market and found most offered lots of gimmicky accessories and features, but at the sacrifice of poor quality optics...many were even plastic lenses. Our educators' concept was to build a durable, basic scope and mount around high-quality, professional optics. With our system, the beginner is assured of high-resolution viewing that will reinforce his or her interest in Astronomy.

Precision Optics...the heart and pride of our 3" F/6 system are the professional-grade optics, ground and polished in our own manufacturing facility from the finest optical glass components. We test each system on our interferometers and collimators to assure performance to the theoretical limits possible.

Wide Field Viewing...essential for the beginner is a wide field of view to assure ease of locating sky objects. Children are easily frustrated and unfortunately most of the traditional high-power long tube designs have a very narrow 1/4° field that makes pinpointing objects nearly impossible. Our 3" F/6 system offers a 1.6° field with the supplied 15mm eyepiece and can be expanded to almost 3° with the optional 28mm RKE® eyepiece. Built-in finder sights are easy to use.

Portable & Durable... Weighing only 12 pounds, it fits easily in even the smallest car. The all-metal mount is extremely stable, eliminating annoying vibrations and the high-impact, thick-wall ABS tube keeps thermal fluctuations to a minimum. The primary mirror has an anti-shock mount and is permanently collimated at our factory to eliminate tedious adjustments.

Versatility...our 3" F/6 accepts all 1-1/4" American Standard eyepieces and accessories so the system can grow with the student's interest. Moreover, all 1-1/4" accessories fit advanced telescopes so purchases do not become obsolete if the student moves up to the next level telescope.

3" F/6 Reflector Telescope	E31,308 $199.95
3" F/6 With Image Erector	E31,639 $279.00

SPECIFICATIONS:

Telescope Type: Newtonian Reflector **Height:** 35" **Weight:** 12 pounds.
Primary Mirror: Pyrex® base, 3" (76mm) diameter, 17-1/2" (445mm) F.L. parabolic mirror. Aluminized, overcoated and figured to 1/8 wave. **Clear Aperture:** 2-7/8" (75mm) diameter, f/6.1 effective focal ratio.
Primary Mount: Closed-cell, factory-collimated for precise alignment; adjustable.
Secondary Mirror: Aluminized and overcoated rectangular mirror, 25mm x 35mm, flat to 1/8 wave.
Secondary Mount: Secondary is affixed to a diagonal stalk, factory-aligned, adjustable.
Eyepiece: 15mm F.L. RKE® Standard 1-1/4" outside diameter.
Focuser: Smooth, positive grip rubber roller focusing mechanism. Focuses from 50 feet to infinity.
Power: 30X with supplied eyepiece. Up to 139X with optional accessory RKE® eyepieces and Barlow.
Field of View: 1.6° with 15mm RKE® eyepiece.
Telescope Tube: Lightweight, impact-resistant, heavy-wall, ABS plastic-treated internally with an anti-reflection black coating.
Telescope Mount: Fixed 40° polar axis equatorial. Leg-thick walled aluminum tubing; fork mount—1/4: thick steel.

Optional RKE® Eyepieces See Page 108.

RKE® System Magnification	28mm 16X	21mm 21X	15mm 30X	12mm 37X	8mm 56X
Stock Number	#30,787	#30,941	#30,819	#30,940	#30,820
RKE® Barlow #61,186	40X	53X	74X	93X	140X

ASTROSCAN® 2001 TELESCOPE CAPTURES HEAVEN'S WONDERS. THE IDEAL FIRST TELESCOPE FOR THE ENTIRE FAMILY

- **Travels everywhere, compact shape and weighs only 13 pounds.**
- **Sets up in just 10 seconds**
- **Extra-wide 3° field makes it easy to find objects**
- **Durable construction for entire family use**
- **Converts to erect-image terrestrial scope with optional accessory**

Astroscan® 2001 Telescope...the stargazer's choice. Reach out and explore the night sky. Astroscan® excels when you turn it to deep sky objects like galaxies, nebulas and star clusters...the Pleiades are absolutely breathtaking!

Innovation...the first really unique beginner's telescope, the Astroscan® 2001 is a proven, respected instrument being used by amateur and professional astronomers the world over. It offers the thrill of simplified stargazing at a truly down-to-earth price.

Precision Optics...they're what make the Astroscan® Telescope so valuable. The heart of its total optical system is an exquisite primary mirror, ground, polished and tested in Edmund Scientific's own modern optical facilities to perform to the theoretical limits possible for its size. Combined with a unique optical window, elliptical secondary mirror and 28mm RKE® eyepiece, it provides spectacular images over a wide, bright field of view. The Astroscan® Telescope makes finding celestial objects both fun and easy!

Wide Field...the Astroscan® Telescope is a 4-1/8-inch clear aperture Newtonian rich-field reflector that provides a breathtaking 3° (or six full moons) of field that literally makes this instrument an open window on the universe.

Unique Prize-Winning Design...winner of the Industrial Design Award for 1976, Astroscan®'s space-age lines make it more than a unique conversation piece. Its creative design has eliminated the cumbersome and complicated mounts typical of most telescopes. Simply place its padded base on any firm, flat surface and you're instantly ready to observe. Its motions are positive and natural, nothing to tighten or adjust and simple enough for even a child to use the first time out.

Portable And Durable...with scope and mount weighing just over 12 pounds, the Astroscan® is delightfully easy to move about and take with you, yet extremely stable due to its large bearing surface. Take it anywhere—its tough ABS body and cast aluminum base are made for a lifetime of active use.

Versatility...as your interests grow, the Astroscan® can keep pace with you. A full line of accessories is available, including other RKE® eyepieces and a Barlow lens for higher powers, camera adapters and an image erector for terrestrial viewing.

The Astroscan® is ready to use when delivered and includes our instrument-quality RKE® eyepiece, open sight finder, shoulder strap and cast aluminum padded base. Also included is a comprehensive information and instruction package that contains a Star and Planet Locator, a 32 page illustrated User's Manual, a booklet that shows you how to "star check" your telescope and a 36-page "Sky Guide" that is packed with useful information. For more details, see specifications.

Astroscan® Telescope	**E2001**	**$389.00**
Astroscan ® with Image Erector. Special!	**E2008**	**$449.00**

SPECIFICATIONS:
Primary Mirror: 4-1/4" diameter; 4-1/8" (105mm) clear aperture f/4.2, 17-1/2" (445mm) f.l. parabolic, 1/8 wave, Pyrex, aluminized & overcoated.
Primary Mount: factory pre-collimated & fixed for precise alignment.
Secondary Mirror: elliptical 1.5" minor axis, 1/8 wave flat, aluminized & overcoated.
Secondary Mount: diagonal support mounted directly to anti-reflection coated optical window, which protects system against dust and moisture.
Eyepiece: 28mm e.f.l. RKE®, 45° apparent field, standard 1-1/4" O.D. barrel.
Magnification: 16X with 28mm RKE®, 75X with optional eyepieces and Barlow.
Field of View: 3.0° at 16X
Focuser: smooth, positive-grip rubber roller-type.
Weight: scope 10.75 lbs., base 2 lbs.
Body: high-impact ABS, 17" long, 10" diameter.
Packaging: heavy duty shipping carton with rigid foam inserts.

ASTROSCAN ® TELESCOPE ACCESSORIES

Straight-Through Image Erector
Specially designed for use with the Astroscan® and a 15mm eyepiece. Contains roof prism that flips inverted image right-side-up and left-to-right for terrestrial viewing. Our most popular accessory.
E2007 $99.00

Tripod Bracket
Made of lightweight aluminum, it permits mounting of your Astroscan® on any standard camera tripod or head. Ideal for field use.
E72,314 $49.95

Tripod
Adjustable height tripod. Folds for easy transporation. Astroscan® base screws directly to tripod top.
E39,257 $79.95

Sun Viewing Screen
Allows observer to safely view the Sun's disc and sunspots. Mounts in carry-strap hole. Eyepiece projects image to screen. *Caution: Do not look directly at sun. Adult Supervision recommended.
E31,777 $59.95

Variable Sliding Tube Camera Adapter
For photography with Astroscan®. Fits over the eyepiece to allow "eyepiece projection photography." Other end is a standard "T" thread which screws into camera—specific "T-adapters".
E42,910 $99.00

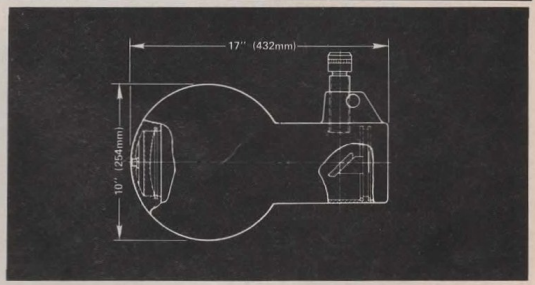
Optional RKE® Eyepieces. **See Page 109.**

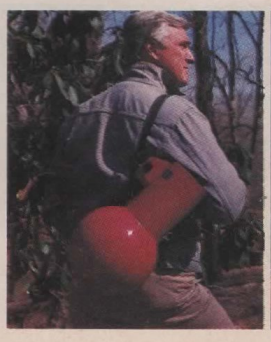
RKE®	28mm	21mm	15mm	12mm	8mm
System Magnification	16X	21X	30X	37X	56X
Stock No.	#30,787	#30,941	#30,819	#30,940	#30,820
Magnification w/ RKE® Barlow 61,186	40X	53X	74X	93X	140X

Tote Bag. Water-resistant, sturdy nylon. Protects Astroscan® from dust and scrapes. Handsome red with white trim & drawstring closure. 24" deep x 16" wide.
E42,698 $36.95

Rubber Base Mat. Anti-skid and protective, this 14" x 1/4" disk supports your Astroscan® on a car hood or tabletop.
E83,023 $11.95

Rubber Eyeguard. Standard equipment included with the Astroscan®'s 28mm RKE® eyepiece. Often requested for replacement or use with other eyepieces.
E60,100 $7.00





THE CARNEGIE MUSEUM OF NATURAL HISTORY PREHISTORIC DINOSAUR COLLECTION

Sculpted under the guidance of the paleontologists of the Carnegie Museum of Natural History, each replica is exactly to scale. Every detail is scientifically accurate and comes with an authentication from The Carnegie Museum. These magnificent and colorful creatures are not merely toys... but an unusual selection of 19 hand painted figures.

Diplodocus 24"	E39,640	$17.95	Apatosaurus Baby 6.5"	E39,649	$3.75
Pachycephalosaurus 7.4"	E39,641	$5.25	Brachiosaurus 22"	E39,650	$18.95
Elasmosaurus 10.5"	E39,642	$5.95	Dimetrodon 3"	E39,651	$1.50
Mosasaurus 6"	E39,643	$5.25	Protoceratops 3.25"	E39,652	$2.75
Euoplocephalus 5.25"	E39,644	$4.25	Tyrannosaurus Rex 11"	E39,653	$5.95
Pteranodon 4.5"	E39,645	$1.50	Parasaurolophus 7.5"	E39,654	$4.50
Maiasaura 8"	E39,646	$7.95	Deinonychus 3"	E39,655	$5.25
Triceratops 7"	E39,647	$5.75	Allosaurus 9.5"	E39,656	$4.75
Apatosaurus 22"	E39,648	$16.75	Stegosaurus 6"	E39,657	$4.75
All 18 Dinosaurs	E39,688	*Just* $99.00...A $122.75 Value			

COMPACT 7-INCH HELIUM-NEON LASER...ONLY $215.00

Ideal for classroom demonstrations, science projects and laboratory experiments. This is our lowest priced laser featuring the classic hard-seal plasma technology which provides better beam quality in terms of coherence and beam shape. Compact housing 2-1/2"H x 2"W x 7-1/4" L weighs only 1.25 lbs. with 0.5mW/633nm minimum output (ClassII Laser product). Complete with 110V wall transformer. Power cord 6'. See page 81 for complete specifications.

The Smallest Laboratory Uniphase Laser	E34,891	$215.00

OUR LOWEST PRICE LASER POINTER

• **Laser Diode Type** • **5-3/8" Long x 5/8" Diameter**

Technology continues to make the diode laser ever more affordable. Our new 3mW laser pointer is truly no larger than a classic fat fountain pen and extremely easy to point and use. It is a very handsome piece with black matte finish aluminum tapered pen body and chrome pocket clip. Battery life is over one hour with continuous use.

Class IIIa Laser **Maximum Output:** 3mw
Beam Diameter: 5mm x 0.9mm (typical)
Beam Divergence: 1.5mrad (typical)
Weight: 2.3 ozs. (includes battery)
Power Requirement: 7VCD (TR175 battery or equivalent)
Polarization: Random
Wave Length: 670nm
Laser Type: Diode (gain guided)
Switch: Momentary On/Off

Laser Pointer	E39,477	$140.00

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For detailed Ordering Information and Shipping Cost Chart, See Pages 2 and 3

24 REALISTIC ADULT AND BABY SEA LIFE CREATURES

Large detailed replicas of the popular creatures that inhabit the world's oceans. 24 different models, both adult and baby. Each replica is hand painted and carefully molded for realism. Adults up to 9-1/2" long; Babies up to 4" long.

Adult Walrus	E39,658	$3.95	Baby Walrus	E39,659	$1.25
Adult Manatee	E39,660	$3.95	Baby Manatee	E39,661	$1.25
Adult Blue Whale	E39,662	$4.75	Baby Blue Whale	E39,663	$1.25
Adult Tiger Shark	E39,664	$4.75	Baby Tiger Shark	E39,665	$1.25
Adult Humpback Whale	E39,666	$4.75	Baby Humpback Whale	E39,667	$1.25
Adult Sperm Whale	E39,668	$4.75	Baby Sperm Whale	E39,669	$1.25
Adult Right Whale	E39,670	$4.75	Baby Right Whale	E39,671	$1.25
Adult Killer Whale	E39,672	$4.75	Baby Killer Whale	E39,673	$1.25
Adult Dolphin	E39,674	$4.75	Baby Dolphin	E39,675	$1.25
Adult Fur Seal	E39,676	$3.95	Baby Fur Seal	E39,677	$1.25
Adult Harbor Seal	E39,678	$3.95	Baby Harbor Seal	E39,679	$1.25
Adult Sea Lion	E39,680	$3.95	Baby Sea Lion	E39,681	$1.25

POISON DART FROGS FROM THE RAINFOREST

Designed in cooperation with the National Aquarium in Baltimore, each colorfully handpainted frog is 2-1/2" long. The toxic poison found in the skin of these frogs has been used for centuries by Indians who use it to coat the tips of their blowgun darts before hunting. **Each $4.75**

A) Azureus (Red) E39,682
B) Histrionicus (Blue) E39,683
C) Auratus (Green) E39,684